VICINITY OF FORT MILLER

33d CONGRESS, 2d *Session.* } SENATE. { Ex. Doc. No. 78.

REPORTS

OF

U.S

EXPLORATIONS AND SURVEYS,

TO

ASCERTAIN THE MOST PRACTICABLE AND ECONOMICAL ROUTE FOR A RAILROAD

FROM THE

MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

MADE UNDER THE DIRECTION OF THE SECRETARY OF WAR, IN

1853-6.

ACCORDING TO ACTS OF CONGRESS OF MARCH 3, 1853, MAY 31, 1854, AND AUGUST 5, 1854.

VOLUME XI.

WASHINGTON:
BEVERLEY TUCKER, PRINTER.
1855.

MISSOURI BOTANICAL
GARDEN LIBRARY

IN SENATE—FEBRUARY 24, 1855.

Resolved, That there be printed, for the use of the Senate, ten thousand copies of the several reports of surveys for a railroad to the Pacific, made under the direction of the Secretary of War; and also of the report of F. W. Lander, civil engineer, of a survey of a railroad route from Puget's Sound, by Fort Hall and the Great Salt lake, to the Mississippi river; and the report of John C. Frémont, of a route for a railroad from the headwaters of the Arkansas river into the State of California; together with the maps and plates accompanying said reports, necessary to illustrate the same; and that five hundred copies be printed for the use of the Secretary of War, and fifty copies for each of the commanding officers engaged in said service.

Attest: ASBURY DICKINS, *Secretary*.

THIRTY-SECOND CONGRESS, SECOND SESSION—CHAPTER 98.

SECT. 10. *And be it further enacted*, That the Secretary of War be, and he is hereby authorized, under the direction of the President of the United States, to employ such portion of the Corps of Topographical Engineers, and such other persons as he may deem necessary, to make such explorations and surveys as he may deem advisable, to ascertain the most practicable and economical route for a railroad from the Mississippi river to the Pacific ocean, and that the sum of one hundred and fifty thousand dollars, or so much thereof as may be necessary, be, and the same is hereby, appropriated out of any money in the treasury not otherwise appropriated, to defray the expense of such explorations and surveys.

Approved March 3, 1853.

THIRTY-THIRD CONGRESS, FIRST SESSION—CHAPTER 60.

Appropriation: For deficiencies for the railroad surveys between the Mississippi river and the Pacific ocean, forty thousand dollars.

Approved May 31, 1854.

THIRTY-THIRD CONGRESS, FIRST SESSION—CHAPTER 267.

Appropriation: For continuing the explorations and surveys to ascertain the best route for a railway to the Pacific, and for completing the reports of surveys already made, the sum of one hundred and fifty thousand dollars.

Approved August 5, 1854.

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I. LETTER OF CAPTAIN A. A. HUMPHREYS, CORPS OF TOPOGRAPHICAL ENGINEERS, TO THE SECRETARY OF WAR, TRANSMITTING LIEUT. WARREN'S MEMOIR.

II. MEMOIR OF LIEUT. G. K. WARREN, CORPS TOPOGRAPHICAL ENGINEERS, UPON THE MATERIAL USED AND METHODS EMPLOYED IN COMPILING THE GENERAL MAP TO ILLUSTRATE THE REPORTS OF SURVEYS FOR RAILROAD ROUTES FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

III. TOPOGRAPHICAL MAPS, PROFILES, AND SKETCHES, TO ILLUSTRATE THE VARIOUS REPORTS OF SURVEYS CONTAINED IN THE PRECEDING VOLUMES OF PACIFIC RAILROAD REPORTS.

LETTER TO THE SECRETARY OF WAR.

WAR DEPARTMENT, OFFICE OF EXPLORATIONS AND SURVEYS,
Washington, D. C., March 2, 1858.

SIR: I transmit herewith a report from Lieutenant G. K. Warren, Topographical Engineers, exhibiting the data and authorities from which was compiled the map of United States territory between the Mississippi river and the Pacific ocean, intended to illustrate the reports upon the Pacific railroad explorations.

It contains a brief account of all the explorations of our territory west of the Mississippi river of approved authority, which will be not only valuable to the officers of the corps, but, it is thought, interesting to the public.

The laborious task of compiling the map and preparing the report has been performed by Lieutenant Warren while occupied with other duties of an onerous character. The more carefully his work is examined, the more apparent will be the industry, care, and sound judgment with which it has been executed.

Very respectfully, your obedient servant,

A. A. HUMPHREYS,
Captain Topographical Engineers, in charge.

Hon. J. B. FLOYD,
Secretary of War, Washington, D. C.

EXPLORATIONS AND SURVEYS FOR A RAILROAD ROUTE FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.—WAR DEPARTMENT.

MEMOIR

TO ACCOMPANY THE

MAP OF THE TERRITORY OF THE UNITED STATES

FROM THE

MISSISSIPPI RIVER TO THE PACIFIC OCEAN,

GIVING

A BRIEF ACCOUNT OF EACH OF THE EXPLORING EXPEDITIONS SINCE A. D. 1800, WITH A DETAILED DESCRIPTION OF THE METHOD ADOPTED IN COMPILING THE GENERAL MAP.

BY

LIEUT. GOUVERNEUR K. WARREN,

CORPS OF TOPOGRAPHICAL ENGINEERS, U. S. A.

1859.

LETTER TO CAPTAIN A. A. HUMPHREYS, TOPOGRAPHICAL ENGINEERS.

WAR DEPARTMENT, OFFICE OF EXPLORATIONS AND SURVEYS,
Washington, D. C., March 1, 1858.

SIR: In compiling the "map of the territory of the United States from the Mississippi river to the Pacific ocean, ordered by the Hon. Jefferson Davis, Secretary of War, to accompany the reports of the explorations for a railroad route," my instructions were to carefully read every report and examine every map of survey, reconnaissance, and travel which could be obtained, to ascertain their several values, and to embody the authentic information in the map. This duty is now to the best of my ability completed.

The maps used in the compilation have been mostly made from reconnaissances, and but few possess very great accuracy. The geographical positions are therefore rarely determined absolutely, or even relatively, with certainty, and new surveys are constantly making slight changes necessary. The work of compilation, therefore, must necessarily be frequently repeated; and to aid the future compiler, I have prepared the accompanying memoir upon the different maps and books used, and upon the manner in which their discrepancies have been reconciled.

This memoir is a brief account of the numerous explorations made in our territory west of the Mississippi river, and I hope may prove valuable to those seeking information with a view to developing the resources of this vast region, as well as interesting to those studying the progress of geographical discovery. The work has been in progress during the past four years; but other public duties have absorbed the greater part of my time, which must be my excuse for its defects. For the beautiful execution of the topography upon the map, I am mainly indebted to Mr. E. Freyhold and Mr. F. W. Egloffstein.

I have the honor to be, very respectfully, your obedient servant,

G. K. WARREN,
First Lieutenant, Topographical Engineers.

Captain A. A. HUMPHREYS,
Corps of Topographical Engineers, in charge of Office of Explorations and Surveys.

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INTRODUCTORY REMARKS.

THE general map accompanying the reports of explorations for railroad routes from the Mississippi river to the Pacific ocean embraces all the territory of the United States from the great lakes and Mississippi river on the east to the Pacific ocean on the west. The plan adopted in constructing it has been to represent only such portions as have been actually explored, and of which our information may be considered reliable. It has been, frequently necessary to decide between the merits of discrepant authorities, and to select those which seem the best. In performing this delicate task, the general principle has been carried out of adopting the work of those explorers who were best provided with instruments, and who possessed the largest share of that experience which is so necessary in attaining accuracy, taking the evidence of these advantages from their own reports.

The compilation has been made from the Pacific railroad explorations and surveys, and from all other reliable maps and works that were available. The determinations and surveys of the United States Land Office, United States Coast Survey, and United States Mexican Boundary Commission have been obtained in advance of their publication, and, in return, copies of this map have been furnished whenever requested, at all stages of its progress. Many authentic manuscript maps have been received from the Bureau of Topographical Engineers, where the systematic arrangement and cataloguing renders them easy for reference. Others have been furnished by the offices of the Adjutant General and Quartermaster General of the army. I have also been favored with maps and books from the Indian Bureau, from the Smithsonian Institution, and from the library of Colonel Peter Force, of this city; and with notes, letters, sketches, and suggestions from officers of the army and others. Many of the maps and reports used have never been printed, while numbers are now out of print and difficult to obtain. There is no library or office of the government in which a complete series of these works can be found.

Before detailing the manner in which the compilation has been made, I have therefore thought it desirable to give a brief account of each of the different explorations, the routes traversed, the methods employed in observing, the maps prepared, &c., &c., in order of date.

By this undertaking I hope to promote the consultation of the original reports and maps, by pointing out to each investigator those works which probably contain information about the region of country especially interesting to himself. As a general rule, I shall confine myself to the explorations made in the territory of the United States.

The maps of the old Spanish and French navigators and explorers who visited the Mississippi, the Gulf of Mexico, and the shores of the Pacific, and who often examined portions of the interior, have nearly all been replaced within our territory by more accurate determinations of our own. They have, therefore, little practical value in this connexion, and will not be specially noticed. An almost complete account of Spanish discoveries in New Mexico prior to 1811 can be found in Baron Humboldt's New Spain. The subject is still further discussed in

Lieutenant James Abert's report of reconnaissances in New Mexico in 1846, Captain A. W. Whipple's report of survey of railroad route near the 35th parallel, and elsewhere.

A valuable history of the progress of early discoveries on the western coast of North America can be seen in a French work by M. Duflot de Mofras, published in 1844, and also in Mr. Robert Greenhow's book on Oregon and California, published in 1845. This last work is accompanied by a map "of the western and middle portions of North America," compiled by Mr. Greenhow.

An elaborate work upon the early discoveries on the coast of America, both upon the Atlantic and Pacific shores, has lately been prepared for the United States Coast Survey by Dr. J. G. Kohl. It will appear in the printed papers of the Coast Survey.

The first exploration which seems to require a detailed notice is that of Captains Lewis and Clarke, United States army, directed by President Jefferson in 1803. The small map herewith presented exhibits the knowledge possessed of our present territory west of the Mississippi river before this exploration was made.

As the explorations are mentioned in order of date, the various examinations in the same region, or along the same route or river, are necessarily separated. To avoid the difficulty which this arrangement presents in making a prompt reference to all the sources of information of any one subject, an index has been prepared, which will be found at the end of this memoir. The political and military divisions of the country are taken in the index as they appear on the first edition of the map, which was correct at the date of this report.

CHAPTER I.

EXPLORATIONS FROM A. D. 1800 TO A. D. 1832.

CAPTAINS LEWIS AND CLARKE, U. S. A., 1804–'5–'6 —MAJOR PIKE, U. S. A., 1805–'6.—HUMBOLDT'S NEW SPAIN, 1811.—RECTOR, C. E., AND ROBERDEAU, T. E., MAP, 1818.—MAJOR LONG, T. E., 1ST EXPEDITION, 1819–'20.—MAJOR LONG, T. E., 2D EXPEDITION, 1823 —J. C. BROWN, C. E., SURVEY, 1825–'26–'27.—R. RICHARDSON, C. E., SURVEY, 1826.—NORTHWEST BOUNDARY COMMISSION, 1828.—BRITISH ADMIRALTY CHARTS, 1828.—LIEUTENANT HARDY, R. N., EXPLORATIONS GULF OF CALIFORNIA, 1825–'26–'27–'28.—ROSS COX'S "ADVENTURES ON THE COLUMBIA," 1832.—LIEUTENANT ALLEN, U. S. A., RECONNAISSANCE OF THE SOURCE OF THE MISSISSIPPI, 1832.—SCHOOLCRAFT'S NARRATIVE, 1832 —FINLEY'S MAP OF NORTH AMERICA, 1826.

EXPLORATIONS OF CAPTAIN MERIWETHER LEWIS, U. S. A, AND CAPTAIN WILLIAM CLARKE, U. S. A., IN 1804–'5–'6.

THE narrative I have consulted most particularly is entitled "*Travels to the Source of the Missouri River and across the American Continent to the Pacific Ocean, performed, by order of the government of the United States, in the years* 1804, 1805, *and* 1806. *By Captains Lewis and Clarke; published from the official report, and illustrated by a map of the route and other maps. London: Printed for Longman, Hurst, Rees, Orme, & Brown, Paternoster Row.*—1814." This book consists of one volume quarto, illustrated by a map on a scale of 70 miles to an inch, showing the country from Lake Superior and the Mississippi to the Pacific ocean, between the 39th and 49th parallels. The other maps are enlarged plans of certain important localities. Another and more common edition, published by the same parties in 1817, is composed of 3 volumes 8vo., with a map on a scale of about 80 miles to an inch.

An account of the expedition was also published in 1808, by Patrick Gass, a sergeant on the exploration; it contains some particulars not noticed in the official narrative.

An abridged edition, prepared by Archibald M. Vickar, was published in two volumes in Harper's Family Library Series, in 18—. The map accompanying this edition has one glaring error, in placing a high range of mountains ranging east and west between the Missouri and Yellowstone rivers.

These explorers began to ascend the Missouri river in keel boats, cordeled by hand, in 1804. They were provided with compasses for determining their courses, and with chronometers, sextants, and artificial horizons for obtaining latitudes and longitudes. They spent the winter of 1804 and 1805 at Fort Mandan, opposite the existing Ree village, or Fort Clarke. The next season, having ascended the Missouri to the Three Forks, and named them Jefferson, Madison, and Gallatin, and believing the first to be the main stream, they followed it to its source.

From the sources of the Jefferson Fork, Captain Clarke, with a few men, passed over to those of the north or east fork of Lewis' river, (Salmon river,) and endeavored to discover a route westward. Finding it impracticable to descend the stream or to cross the mountains lying west of it, that route was abandoned. The party then ascended Fish creek, a small branch of Salmon river, and crossing a high mountain ridge to the east, entered the valley of the Bitter Root river. This they descended to the mouth of Traveller's Rest creek, named Lou-Lou

Fork, on Governor Stevens' map. Having ascended this last creek to its source, they crossed the Bitter Root mountains with difficulty, and came upon the sources of the Koos-koos-ky. Unable to follow this stream through its cañons, they wandered to the north among the mountains, suffering great hardships, and being compelled to eat their horses from want of food, until finally they reached the Koos-koos-ky where it is navigable for canoes. Having constructed boats, they sailed down that stream to Lewis' river, passing several dangerous rapids on the way. They next followed Lewis' Fork to the Columbia river,* which they explored to its mouth, reaching the Pacific in December. Winter quarters were established at Fort Clatsop, where they remained till the latter part of March, 1806.

The expedition started again in April and returned by nearly the same route to the mouth of Traveller's Rest creek, experiencing some embarrassment from the snows and from the want of forage, and being often compelled to subsist upon horse and dog flesh. At the mouth of Traveller's Rest creek the party divided; Captain Lewis, with one portion, proceeded up the Hell Gate river to the Cokalahiskit river, (Blackfoot Fork,) and thence up the latter to its source; crossing the divide between the Columbia and the Missouri by what Governor Stevens calls Lewis and Clarke's Pass, although Captain Clarke did not go through it. Next proceeding northwardly to the sources of Maria's river, Captain Lewis followed this stream to its mouth, and then passing down the Missouri he overtook and joined Captain Clarke. Captain Clarke, on separating from Captain Lewis at Traveller's Rest creek, proceeded up the Bitter Root river to its source, and crossing the divide† between the Missouri and Columbia by a much more favorable route than that examined by the party on their outward journey, reached the point on the Jefferson Fork where the canoes had been left. He passed down this stream to its junction with Gallatin's Fork; ascending the latter stream a short distance, he crossed the divide between it and the Yellowstone, and then journeyed down this river to a point where timber was found sufficiently large to make canoes. These he constructed, and thus navigated the river to its mouth. Floating thence leisurely down the Missouri, he was soon afterwards joined by Captain Lewis, and the two parties, "happily united," returned together to the regions of civilization.

It does not appear from the journal I have read that the explorers relied much upon determinations for longitudes. That of the mouth of the Platte was taken by them half a degree too far west; that of the mouth of the Yellowstone accords well with the best recent determi-

* The Columbia river derives its name from the American trading ship Columbia, commanded by Captain Gray, who entered its mouth in 1792, and examined it as far as Gray's bay. He shortly afterward met the celebrated navigator Vancouver, to whom he gave a chart exhibiting his discoveries. Vancouver visited the river and his lieutenant, Broughton, explored it more than one hundred miles.

The existence of this river was known long before the visits of Gray and Vancouver, but the information concerning it was vague and uncertain. One or two unsuccessful attempts had been made to discover its mouth, where it is supposed a Spanish ship was wrecked in early times.

The name Oregon was at one time applied to the Columbia, and from this circumstance the Territory of Oregon has derived its name. The word seems to have originated in a work by Jonathan Carver, published in London in 1778, and the subject is ably discussed in Mr. Greenhow's History of Oregon and California, from which I make two quotations: "In the preceding extracts from Carver's book, embracing all that he has said respecting his Oregon or Great River of the West, there is certainly nothing calculated to establish the identity of the stream to which those vague descriptions and allusions apply, with the Columbia or any other river." * * "As to the name *Oregon*, or the authority for its use, the traveller is silent; and nothing has been learned from any source, though much labor has been expended in attempts to discover its meaning and derivation: it was most probably invented by Carver."

† Lieutenant Mullan calls this the Bighole Mountain Pass.

nations; that of the mouth of the Columbia was taken one degree too far west. The place which they mention as the extreme navigable point of the Missouri is placed by their observations on latitude 43° 30′, while the most southern point on Jefferson Fork is, according to Governor Stevens' map, in about latitude 44° 30′; thus showing a considerable discrepancy. Most of the routes and rivers they examined have been re-explored, the only exceptions being the sources of Salmon river, the Missouri river from the Gate of the Mountains to its source, and the Yellowstone, from the point where Captain Clarke struck it to the mouth of Powder river. The tests to which the maps of this exploration have been subjected prove them to have been carefully made and with great accuracy, considering the means and circumstances of the party.

The original map represents the different ridges of the Rocky mountains with a general northwest trend from the Black Hills westward, and it is neither responsible for the error of representing those north of the Platte with a northeast trend, nor for the false indication of a range of mountains running east and west between the Yellowstone and Missouri. Deceived by the size of the Wallamath at its mouth, these explorers supposed it to be a stream of great length, and represented it on their map as heading to the southwest in the vicinity of what is now known to be the Great Salt lake. The names they gave to the rivers have been generally adopted, although a little confusion exists about some of the smaller ones. Captain Clarke speaks of one Fish creek, a branch of the head stream of Salmon river, and of another Fish creek near it on the east of the great divide, running into Wisdom river. Again, Lieutenant Mullan says, in his report to Governor Stevens of his examinations across the Bitter Root mountains, (P. R. R. Report, vol. I, quarto edition, page 530:) "Through this prairie flows a small creek to the headwaters of the Clearwater, called by Messrs. Lewis and Clarke "Glade creek." The creek which is called by Captain Clarke Glade creek is at the source of Wisdom river. Captain Lewis' melancholy death occurred before the completion of the narrative, thus devolving the whole labor of the report upon his able associate, Captain Clarke. Several editions of the work have appeared, differing somewhat from each other, and thus, no doubt, has arisen the misunderstanding now existing concerning the names of places.

EXPLORATIONS OF MAJOR Z M. PIKE, U. S. A., 1805–'6–'7.

The narrative I have consulted is entitled "*An Account of Expeditions to the Sources of the Mississippi, and through the western parts of Louisiana, to the Sources of the Arkansas and Pierre-jaun Rivers, performed, by order of the Government of the United States, during the years* 1805, '6, *and* '7; *and a Tour through the interior parts of New Spain, when conducted through these provinces by order of the Captain General, in* 1807. *By Major Z. M. Pike; illustrated by maps and charts. Published by C. & A. Conrad & Co., Philadelphia. John Binus, printer.*—1810." Accompanying it is a map of the Mississippi river, from the mouth of the Missouri river to Leech lake, on a scale of about 25 miles to one inch; a map, in two sheets, on a scale of about 40 miles to one inch, showing the supposed positions of the Platte, Arkansas, and Red rivers, from their mouths to their sources; and a map of New Spain, in two sheets, on a scale of about 75 miles to an inch.

In 1805 and '6, Lieutenant Pike,* in his expedition to the sources of the Mississippi, ascended

* Major Pike was a lieutenant while the making both of the explorations noticed here, and was promoted after his return.

the stream from the mouth of the Missouri to what is called Upper Red Cedar lake, (since named Cass lake,) and examined Turtle river, an affluent of this to its sources. He also examined Leech lake and Leech river, to its junction with the Mississippi. His map of the river gives its general direction with considerable accuracy, and is the more creditable to him, since, in his own language, "in the execution of this voyage I had no gentlemen to aid me, and I literally performed the duties (as far as my limited abilities permitted) of astronomer, commanding officer, clerk, spy, guide, and hunter."

Lieutenant Pike's second expedition was to the sources of the Arkansas, with the intention of passing thence south to those of Red river of Louisiana, and descending this stream to Natchitoches. He was accompanied by Lieutenant James B. Wilkinson, U. S. A., and Dr. J. H. Robinson, M.D., and was provided with a sextant, chronometer, and compasses. He started from Belle Fontaine, (near the mouth of the Missouri,) ascended this river to near the mouth of the Osage, and thence up the latter to the great Osage village. Here, abandoning his boats, he ascended to one of its sources by land, and proceeded westwardly, crossing Grand river, (also called Neosho river.) Thence, turning toward the north, he crossed, successively, the Smoky Hill Fork, the Grand Saline, and Solomon's Fork, (the latter two of which he erroneously represents as running into the Republican Fork,) and reached the Republican Fork at the Pawnee village. Proceeding thence southward, he recrossed the several branches which flow into the Smoky Hill Fork, and reached the Arkansas river near the mouth of Pawnee Fork. Here he detached Lieutenant Wilkinson, with five men, to make a reconnaissance of the Arkansas down to its mouth, which he successfully accomplished.

Lieutenant Pike set out with the remainder of the party to explore the river to the mountains. Arriving at a southern branch, the "Third fork," (called on Major Long's map the St. Charles river, now known as the Greenhorn river,) he built a small fort, and, leaving it defended by a portion of his party, started toward the northwest to examine the "Grand Peak." Arriving within sixteen miles of it, on the 27th of November, he saw, from the summit of a mountain, where the snow was three feet deep and the thermometer 4° below zero, that this peak towered above him to a height equal to the altitude above its base of the one upon which he stood. He therefore abandoned the idea of climbing it, as he believed "no human being could have ascended to its pinnacle." This peak, he says, "was so remarkable as to be known to all the savage nations for hundreds of miles around, and to be spoken of with admiration by the Spaniards of New Mexico, and was the bounds of their travels northwest." He estimated its elevation above the sea 18,581 feet.*

Lieutenant Pike returned to his fort at the mouth of the "Third fork," and continued his exploration up the Arkansas. Ascending one of its northwestern branches, he crossed the divide at its source, and was much surprised to discover a stream forty yards wide flowing toward the northeast, which he concluded was the Platte, (the south forks of which it probably was.) He had expected to find there the source of Red river, running to the southwest. Continuing on in the northwest course, he struck another stream, which he supposed was Red river. Subsequently, discovering his error, he concluded that it was the source of the Pierre-jaun, (Yellowstone,) and it is so mentioned on the title page of the book.

Major Long, in his map of the expedition to the Rocky mountains, in 1820, represents this stream as the source of Lewis' Fork of the Columbia. Mr. James, who wrote the narrative of

* See discussion of the altitude of this peak in describing Major Long's expedition to the Rocky mountains.

Major Long's expedition, thought it must have been the north fork of the Platte. A comparison of Pike's map with Frémont's makes it evident that it was the source of what Frémont calls Grand river, which unites with Green river, and forms the Great Colorado of the west, a tributary of the Gulf of California. From this it appears that Lieutenant Pike has the honor of being the first American explorer that reached the sources of this large river, and the second that crossed the divide between the waters of the Atlantic and Pacific oceans.

Still searching for the sources of Red river, Lieutenant Pike turned to the south, and came upon another stream, which he recognized as the Arkansas. He was now in great perplexity, so completely had he been deceived as to the sources of Red river. He was in the mountains, "in the most inclement season of the year; not one person clothed for the winter, many without blankets, (having been obliged to cut them up for socks, &c.;") raw buffalo hide made them a miserable substitute for shoes, and at night they lay "on the snow or on the wet ground, one side burning, whilst the other was pierced with cold wind;" often, too, they were near starving; still he would not give up his search, though at a loss where to go. Proceeding to the south, up a branch of the Arkansas, some of his men's feet were so badly frozen that a party was left behind. He finally crossed the "Great White mountain" (Sierra Blanca,) near the Sand hills, and found himself on the banks of a stream flowing south, which he did not doubt was the long-sought Red river. Here he built a small block-house for defence, and sent back for the men he had left behind. These were ultimately rescued, but were cripples for life. While at his fort, waiting the return of his men, he was visited by some Spanish officers, one of whom said that the governor of New Mexico, having heard that he had lost his way, had sent to offer him whatever he might need, and to conduct him to the head of Red river. Lieutenant Pike was astonished to find that he was then on the banks of the Rio Grande del Norte, and a trespasser on foreign soil. Willing to make every honorable explanation, he accepted their offer to visit the governor of Santa Fé, who, as soon as he was in his power, treated him as a prisoner, and he was sent to Governor Salcedo, at Chihuahua. On the pretence of wishing to examine his papers and sketches, Governor Salcedo obtained possession of his notes, most of which were never returned, as he considered the documents contained proofs "that an offence of magnitude" had "been committed against his Majesty." From this cause his map was, probably, much less complete and perfect than it would otherwise have been. Fortunately the journal and a copy of the courses and distances were preserved. Lieutenant Pike was otherwise treated with the greatest politeness by the Spaniards, and they escorted him safely through Texas to Natchitoches, on Red river.

Nearly every part of the country traversed by Lieutenant Pike has since been explored by parties better provided with instruments, and his determinations are now replaced by others more accurate.

Red river, the discovery of whose sources was one of the main objects of Major Pike's* expedition, was examined in 1806 by a party under Captain Sparks, from the mouth as far up as the Spanish border. Here he was met by a Spanish force very much superior to his in numbers, and prevented from going further.

At this time the boundary between Louisiana and New Spain was not definitely agreed upon,

* Major Pike became a general during the war of 1812 with Great Britain, and was killed by a stone thrown from a mine which his enemies sprung as they abandoned a fort from which his command had just forced them. In the preface to the English edition of Lewis & Clarke's Explorations, a foot-note erroneously states that he was killed by the accidental explosion of a magazine in a fort at which he was stationed.

and the Americans and Spanish each maintained troops near the border to prevent the incursions of the opposite party. Burr's schemes were also agitating the public mind, and probably increased the suspicions of the governments of both nations.

The exploration of Red river was particularly desirable to the United States as being part of a proposed boundary line, with which the Spaniards were probably already well informed. Captain Pike, in a letter to Governor Salcedo, dated Natchitoches, August 20, 1807, says: "If the continuation of an amicable understanding between the two nations is an object of estimation in the mind of your excellency, the final demarcation of limits must be considered as the first great step to be taken towards its accomplishment; and to enable my government to form a correct idea on that subject it was requisite they should be *well* acquainted with the geographical situation of the heads of the Arkansas and Red rivers, the former part of which I had accomplished, and could with all ease have carried the remaining part into execution (after discovering my mistake of the Rio del Norte for the Red river) had I been permitted by the governor of New Mexico."

HUMBOLDT'S NEW SPAIN, 1811.

The edition of this work, which I have consulted, is entitled "*Political Essay on the Kingdom of New Spain, containing researches relative to the geography of Mexico; the extent of its surface, and its political division into intendencies; the physical aspect of the country; the population; the state of agriculture and manufacturing and commercial industry; the canals projected between the South sea and Atlantic ocean; the crown revenues; the quantity of the precious metals which have flowed from Mexico into Europe and Asia since the discovery of the New Continent; and the military defence of New Spain. By Alexander de Humboldt; with physical sections and maps, founded on astronomical observations and trigonometrical and barometrical measurements. Translated from the original French by John Black. Second edition. London: Printed for Longman, Hurst, Rees, Orme, & Brown, and H. Colburn*—1814." It is accompanied by an original map, on a scale of 120 miles to an inch, "*of New Spain, from* 16° *to* 38° *north latitude,*" between the 94th and 114th meridian; "*reduced from the large map drawn from astronomical observations at Mexico, in the year* 1804, *by Alexander de Humboldt; and comprehends the whole of the information contained in the origi na map, except the heights of the mountains.*"

This work, completed by the Baron Humboldt for the Spanish government in 1808, is almost a complete summary of all the explorations made by the Spaniards down to the date of its preparation, and is therefore of much value in showing the extent of their knowledge at that day. It shows that Father Escalante, in 1777, visited or gained information about Lake Timpanogos, (doubtless Utah lake, which has an affluent now called by that name, and which is fresh, like the one described by him,) and also Lake Salado, (probably Sevier lake,) which, he says, receives the waters of the Rio de San Buenaventura, its western limits being unknown. Baron Humboldt did not entertain the idea that any large river flowed into the Pacific ocean from the region which now composes the Territory of Utah, as was generally represented on all the English maps. His work does not, however, give any positive information about the topography and hydrography of any portion of our present territory, which the explorations of our government have not replaced by more accurate results. Still, as it has formed the basis of many classifications of the great mountain system, and abounds in valuable enunciations of the true principles of hydrography and topography, no one should neglect to consult it whose scientific investigations extend to the country west of the Mississippi.

RECTOR'S AND ROBERDEAU'S COMPILED MAP, 1818.

This map is titled, "*Sketch of the western part of the continent of North America, between latitudes* 35° *and* 52° *N.*," from the 87th meridian to the Pacific ocean, on a scale of about 47 miles to an inch. "*This map, of an extent of country including more than* 20° *of latitude and* 50° *of longitude, was originally drawn under the inspection of William Rector, esquire, surveyor of the United States for the Territories of Missouri and Illinois, and was by him presented to the General Land Office, January* 21, 1818. *It is probably the most correct map of the country now extant. Signed Josiah Meigs, General Land Office, January* 21, 1818; *Roberdeau, U. S. T. Engineers, del.*"

From the year 1807 to 1819, our country was much of the time involved in foreign difficulties, and little was done, so far as I have been able to learn, in exploring our western possessions. This map of Rector and Roberdeau has, I believe, never been published; and, as it shows the extent of the existing information at that time, which was prior to the expeditions of Major Long, I have thought it desirable to present a reduced copy, (Plate II.) On it, as on Pike's map, the Red river of Louisiana is represented as heading where the sources of the Canadian are now known to be. The Rio Grande is represented as rising to the north of the sources of the Arkansas, near those of the Bighorn river, or near the true position of the source of Green river. The sources of Lewis' Fork of the Columbia are correctly represented relatively to those of the Yellowstone. The Rio de San Rafael is indicated as the most northern branch of the Colorado of the West, as it is on Humboldt's map of New Spain. The Wallameth is represented as heading near the Rio San Rafael, as it is on Lewis and Clarke's map. Only one large river is represented as flowing into the bay of San Francisco, heading to the southeast of it. Neither the Great Salt lake, nor Lake Salado, nor Lake Timpanogos, nor any other in this region, is represented. On it there is no indication of those hypothetical streams, the Rio San Buenaventura, the Rio Timpanogos, or the Rio los Mongos, flowing from a large lake into the Pacific; rivers which had gained a place, and continued long after to be represented on English maps. The representations of mountains west of the Rocky mountain range is quite singular, but it can be better understood from the map than from any description.

MAJOR S. H. LONG'S FIRST EXPEDITION, 1819 AND 1820.

"*Account of an Expedition from Pittsburg to the Rocky mountains, performed in the years* 1819 *and* 1820, *by order of the Hon. J. C. Calhoun, Secretary of War, under the command of Major Stephen H. Long, from the notes of Major Long, Mr. T. Say, and other gentlemen of the exploring party: compiled by Edwin James, botanist and geologist for the expedition. In two volumes, with an atlas. Philadelphia: H. C. Carey and I. Lea, Chestnut street.*—1823." This book also contains Major Long's official report. Accompanying the publication is a map, in two sheets, on a scale of 75 miles to an inch, embracing the country from the meridian of Washington to the Rocky mountains, between the 33d and 47th parallels. The original map in the Topographical Bureau is in one sheet, on a scale of 36 miles to an inch. The same work was republished "*in three volumes in London: printed for Longman, Hurst, Rees, Orme & Brown, Paternoster Row.*—1823."

This expedition started from Pittsburg, Pennsylvania, early in April, 1819, on board the small steamboat Western Engineer, under command of Major Long. He was assisted by Major Biddle, Lieutenant J. D. Graham, U. S. A., Cadet W. H. Swift, Dr. Baldwin, Dr.

Thomas Say, Mr. Jessup, Mr. T. R. Peale, and Mr. Samuel Seymour. They were provided with chronometers, sextants, telescope for observing occultations and eclipses, and with compasses. They descended the Ohio river to its mouth, ascended the Mississippi to the mouth of the Missouri, and up this river to Old Council Bluff, which was the end of their travels that season, the main body wintering there at Engineer Cantonment.

On their way up the Missouri Mr. Say, with a party consisting of Messrs. Jessup, Peale, Seymour, Cadet Swift, Mr. J. Dougherty, and five men, had been detached at Fort Osage to explore the country along the Kansas, and between that river and the Platte, and then to descend the last named stream to its mouth. They ascended the Kansas to the mouth of the Blue river, but were met by a war party of Pawnees, who stole all their horses and baggage, and forced them to return to the Missouri, which they reached at Cow island, and followed to the mouth of Wolf river, where they rejoined the command.

Major Long returned to the seat of general government during the winter, and was accompanied the next spring by Captain John R. Bell, United States army, who took the place of Major Biddle, and by Dr. E. James, as botanist and geologist, in the place of Dr. Baldwin and Mr. Jessup, the former having died while ascending the Missouri river. Lieutenant Graham returned from Engineer Cantonment with the steamboat.

On the 6th of June, 1820, Major Long left Engineer Cantonment, and proceeding nearly west reached the Platte river, up which he travelled to the mouth of Loup Fork, and thence continued along the north side of this fork to the Grand Pawnee village. Here crossing the river he took a course nearly south to the Platte, striking it about forty miles below where Fort Kearny now stands. The party then followed the north side of the Platte as far as the forks; crossed both forks and travelled up the right bank of the South Fork to the place where it escapes from the Rocky mountains. They then examined the mountains from the South Fork of the Platte to the Arkansas.

Dr. James, with two men, ascended and examined the Grand Peak described by Major Pike, and determined the rock to be of the primitive formation. In the narrative this is called James' Peak. By triangulation Lieutenant Swift found it 8,500 feet above his place of observation, which was estimated at 3,000 feet above the sea. Captain Frémont, in his report and map of explorations in 1843 and 1844, calls it Pike's Peak, probably because it was so called by the white people in the country at the time of his exploration, and this is the name which it now bears. To Mr. James, it would seem, should belong the honor of giving his name to this noted peak, as he was the first explorer to reach its summit. Major Long in his notes says, "from the information received from hunters and trappers it was believed that no one, either civilized or savage, had ever ascended it before," and adds, that "Dr. James having accomplished this difficult and arduous task, I have thought proper to call the peak after his name."

The elevation of Lieutenant Swift's point of observation must have been, according to Captain Frémont's barometric determinations, about 6,000 feet above the sea. This would make the elevation of Pike's Peak about 14,500 feet—about 1,000 feet higher than Frémont's Peak, in the Wind River mountains. A high peak, which gave Major Long's party the first glimpse of the Rocky mountains, has since been known as *Long's Peak.* It stands just west of St. Vrain's Fort, from which it is distant about forty miles; and although the party did not approach it nearer than this, Major Long considers it much higher than Pike's Peak.

Major Long's party then proceeded south to the Arkansas, which they followed up to the gorge, where it comes out of the mountains. In this neighborhood are some mineral springs,

which they named Bell's Springs, after Major Bell. The command was divided on the Arkansas, about twenty-five miles above Old Bent's Fort. One detachment, under Major Bell, explored the Arkansas to Fort Smith, continuing all the way on the left bank. The other, under Major Long, left the Arkansas, and travelling in a direction a little east of south, intended to strike the sources of Red river and explore that stream to its mouth. They, however, took the Canadian for the Red river, and proceeding down its valley did not discover their mistake until they reached the Arkansas. The most western sources of the Canadian lie about 150 miles in a straight line west of the place where Major Long first struck it.

This was the third attempt by exploring parties, under the United States government, to discover the sources of Red river. The explorations of Major Long's expedition, made in Arkansas and Missouri on their return, have been replaced by the surveys of the United States Land Office. The only portions of the route of this exploration which have not been re-examined are the trails from the Arkansas to the Canadian, and from the Great Bend of the Arkansas to Fort Gibson.

The astronomical observations by Major Long, Lieutenant Graham, and Lieutenant Swift, consisted of altitudes and lunar distances by the sextant, and eclipses of Jupiter's satellites, observed with a four feet telescope. The relation of their determinations to those of subsequent parties will be discussed hereafter. Their barometers were all broken before they reached the forks of the Platte. On the map which was made by Major Long we see the Black Hills of Nebraska represented as a north and south range, differing from Lewis and Clarke's map, which gave them a northwest trend. This is the first original map which represents this range as running north.

MAJOR LONG'S EXPEDITION TO THE SOURCE OF THE ST. PETER'S RIVER.

The work I have consulted is entitled "*Travels in the Interior of North America, with the particulars of an Expedition to the Lakes, and the source of the St. Peter's river. By Messrs. Long, Keating, and Colhoun; in two volumes. London: Printed for G. B. Whittaker, Ave Maria lane.*—1828." It is accompanied by a map, on a scale of 35 miles to an inch, exhibiting the route of the expedition. It includes the area limited on the northeast by a line drawn from Lake Winnipeg to the east end of Lake Ontario; on the southeast by a line from Lake Ontario to Pittsburg; on southwest by one from Cincinnati to Rock Island, in the Mississippi; and on the northwest by one from the Mandan villages to Lake Winnipeg.

This expedition was commanded by Major S. H. Long, topographical engineer, who was assisted by Thomas Say, zoologist, antiquarian, and botanist; William H. Keating, mineralogist and geologist; and James C. Colhoun, astronomer, who was supplied with a sextant and pocket chronometer. Distances were estimated and courses taken by compasses. Mr. Say and Mr. Keating, by the latter of whom the published narrative was written, acted as joint literary journalists. They started from Philadelphia in April, 1823; travelled to Wheeling; thence to Columbus; thence to Fort Wayne, on the Miami river, where they obtained a few soldiers to accompany them, and thence to the southern extremity of Lake Michigan. The journey between these last two places was through a wilderness, and on reaching Chicago they found it to consist "of a few miserable huts, inhabited by a miserable race of men," though it was, "perhaps, one of the oldest settled places in the Indian country." From this point they proceeded through the unknown wilderness to Fort Crawford or Prairie du Chien, at the junction of the Wisconsin and Mississippi rivers. From this point one portion proceeded rapidly

by land up the right bank of the Mississippi to Fort Snelling. The other part arrived there soon after by water. This place had been visited by Major Long in 1817, and its site recommended for a permanent military post, which was established in 1819.

At Fort Snelling Colonel Leavenworth furnished Major Long with a new escort, consisting of an officer, three non-commissioned officers, and eighteen soldiers, making the whole party consist of thirty-three men. This was the first authentic exploration to the sources of the St. Peter's or Minnesota river, though its lower portions had probably been visited by M. Le Sueur as early as 1695.—(See Keating's narrative of Major Long's expedition for an interesting account of its first discovery.) The expedition ascended the river both by land and water to its source in Big Stone lake, and passed the divide between it and Lac Traverse, which, in high water, is sometimes submerged so that the two lakes unite. They then proceeded down Swan river (now called Bois de Sioux river) to its junction with Red river, and along the valley of the latter to its intersection by the 49th parallel, determining this point by astronomical observations. It was Major Long's intention, according to his instructions, to continue along the 49th parallel to Lake Superior, but being convinced of the impracticability of so doing by representations made to him, he continued down the valley of Red river, through the British possessions, to Fort Gerry, at the mouth of Assiniboin river, and thence to Lake Winnipeg, and along its southern shore to Fort Alexander, at the mouth of Winnipeg river. From this place the party ascended the Winnipeg river to Lake of the Woods, across this to Rainy Lake river, up this to Rainy lake, across this lake, Sturgeon lake, and the chain of lakes, to Thousand lake, where they made the Portage du Prairie to the source of Dog river, and proceeded down this stream to Fort William, on Lake Superior, making seventy-two portages after leaving Lake Winnipeg. The scenery along this portion of the route is described as very picturesque, abounding in falls, cascades, rapids, lakes, and islands. The Falls of Kakabeka, on Dog river, near Lake Superior, are 130 feet high.

From Fort William the command coursed along "the dreary northern shore of Lake Superior" by water to the Saute St. Mary, which may be considered the terminus of the expedition. The astronomer, Mr. Colhoun, made numerous observations, which embraced every kind of which a sextant is capable. Our knowledge of the route has been improved by other explorers from the mouth of the St. Peter's river to the 49th parallel, but from that point to the mouth of Dog river this map is our only authority along the route explored. The Shayenne river, which Major Long supposed to be only fifty miles long, has since been shown to have a valley about 300 miles in length.

J. C. BROWN'S SURVEY OF ROAD FROM FORT OSAGE TO TAOS, 1825–'6–'7.

In the Topographical Bureau there is one map, in two sheets, of this survey, on a scale of four miles to an inch, another on a scale of twelve miles to an inch, and a third on a scale of four miles to an inch, in thirty-one sections, "of the road surveyed and marked out from the western frontier of Missouri, near Fort Osage, to San Fernando de Taos, near Santa Fé, in New Mexico, by order of the government of the United States, in the years 1825, 1826, and 1827, with accurate and minute notes and directions for the use of travellers," which begins thus: "The following pages contain a map of the road, as surveyed and marked out from the frontier of Missouri to Taos, the first settlement in the direction to Santa Fé, under the direction of Benjamin Reeves, George C. Sibley, and Thomas Mather, commissioners appointed by the President of the United States for that purpose."

This survey was made with a chain and compass, corrected by observations for latitude with a good sextant. The longitudes were referred to the meridian of Fort Osage, which was taken at 93° 51′ 03″. This road is that of the Santa Fé trail, along the divide between the Kansas and Arkansas rivers. It strikes the latter stream near the Plum Buttes, and follows up its valley to Choteau's island. Here it turns southward to the Cimarron river, follows this stream about eighty-seven miles, and then bears off to the Rabbit's Ear creek, which is marked on this map as the head of the north fork of the Canadian. Continuing west, the road enters the mountains near the source of Ocate river, and terminates at Taos.

These maps, though not displaying great skill in topographical representation, were constructed from a survey more elaborate than any subsequent one over the same route. They are, therefore, of much value at the present time. The names now in use along the line were many of them given by this party. I am not aware that the original map and notes have ever been published.

R. RICHARDSON'S SURVEY OF ROAD FROM LITTLE ROCK TO FORT GIBSON, 1826.

The map of this road, in the Topographical Bureau, is constructed on a scale of four miles to an inch. The survey was made, I believe, with a chain and compass, and is valuable as showing the relative longitudes of Fort Smith and Fort Gibson. It does not seem to have been used on late compilations.

NORTHWEST BOUNDARY COMMISSION, 1828.

The commissioners appointed under the treaty of Ghent for ascertaining and establishing the north and northwestern boundary between the United States and Great Britain, made a decision, (June 18, 1822,) at Utica, New York, which was published by a resolution of the United States House of Representatives in 1828. As this publication extends their labors no further west than the outlet to Lake Superior, the information and maps do not relate to the region under consideration. I believe that the surveys made under the commission were extended as far west as the Lake of the Woods, and according to these the boundary line was fixed in the second article of the Ashburton treaty. In the State Department there is a map, in five sheets, on a scale of an inch to two miles, a reduction of which was published on Nicollet's map of the hydrographical basin of the Upper Mississippi. The original maps have the following title: "Map of a part of certain surveys along the water communications northward of Lake Superior, commencing at the mouth of the Pigeon river and extending westward to Lake Namekan; made by order of the honorable the commissioners under the sixth and seventh articles of the treaty of Ghent.

"Signed:

"PETER B. PORTER, } *Commissioners.*
"ANTH. BARCLAY, }
"I. FERGUSON, *Surveyor.*
"GEORGE W. WHISTLER, *U. S. Artillery,*
"*Draughtsman and Assistant Surveyor.*"

BRITISH ADMIRALTY CHART OF LAKE SUPERIOR, 1828.

This chart, published from reconnaissances made by Lieutenant H. W. Bayfield, R. N., are, to this day, the best we have of the northern shore of Lake Superior.

LIEUTENANT HARDY, R. N.—EXAMINATION OF GULF OF CALIFORNIA, 1825-'26-'27-'28.

Lieutenant Hardy visited the whole coast of the Gulf from Mazatlan around by the mouth of the Colorado to Loredo, in search of pearl fisheries. He did not determine any positions by astronomical observations, and his map has not been used by me.

ROSS COX.—ADVENTURES ON THE COLUMBIA RIVER.

This book is entitled "Adventures on the Columbia River, including a Narrative of six years on the Western side of the Rocky Mountains among various tribes of Indians hitherto unknown, together with a Journey across the American Continent: By Ross Cox. Published by J. J. Harper, New York.—1832."

The journey across the continent was made up the Columbia to one of its northern sources, crossing the Rocky mountains at the head of the Athabasca river, near Mount Hooker, in about latitude 52° 10′ north. The book is very interesting and instructive in regard to the early operations of the fur companies.

RECONNAISSANCE OF THE SOURCES OF THE MISSISSIPPI RIVER, BY LIEUTENANT J. ALLEN, U. S. A., 1832.

The report of Lieutenant Allen, with map, on a scale of 5.75 miles to an inch, exhibiting the Mississippi river from Lake Pepin to its source, together with the country adjacent to his routes, is printed in Ex. Doc. No. 323, 1st session 23d Congress.

He states that "the route of the expedition was up Lake Superior to Fond du Lac; thence up the Fond du Lac river ninety-one miles to the mouth of the East Savanne river, and across by the latter river, the Savanne portage, and the West Savanne river, to Sandy lake and the Mississippi; thence up the Mississippi, through Lake Winnipeg, Upper Red Cedar or Cass lake, and Lac Traverse, to Lac la Biche or Elk lake, *the source of the river;* thence returning back to Cass lake, and across the country by small lakes and portages to the source of Crow Wing river, and down this to the Mississippi river again; down the Mississippi fifty-nine miles below the Falls of St. Anthony to the St. Croix river, up the latter to its source in upper Lake St. Croix, and thence down the Bois Brule river to Lake Superior again, twenty miles from Fond du Lac river, by which we had left the lake on our way up, and thence back to St. Ste. Marie, the point from which we started. We were about eighty days, between the 6th of June and 26th of August, and travelled in that time 2,000 miles. * * * *"

"I was not furnished with, nor could I procure at Fort Brady, any instruments by which to fix, from astronomical observations, the true geographical positions of points necessary to be known for the construction of an accurate map; and to obviate this inconvenience I had recourse to a method of tracing the whole route between the few points fixed and given by the observations of former travellers. For this purpose a compass, the only instrument I had, was placed in my canoe, where it was constantly under my eye; and as the canoe proceeded in the line of a river, I carried my observations from the compass to a field-book at every bend or change of direction, thus delineating in my field-book all the bends of the river precisely as they occurred; and by establishing a scale of proportions in the lengths of the reaches, I was also in this way enabled to lay down and preserve the general curve of a river with surprising accuracy, as was tested afterwards in constructing on my map the routes of rivers between known points. The distances were estimated with great pains and care, and from the combined judgment of all the gentlemen of the party. * * * *

"On the portion of the Mississippi above Cass lake, which was the least known of any part of the river and route, I bestowed on the tracing and computing of distances the most unremitted attention."

To Lieutenant Allen we are indebted for the first topographical and hydrographical delineation of the source of the Mississippi, and this, somewhat improved by Mr. Nicollet, is our authority at the present day for the Mississippi above the mouth of Swan river. Lieutenant Allen was a companion of Mr. H. R. Schoolcraft, whose labors and writings are so well known.

SCHOOLCRAFT'S NARRATIVE OF THE EXPEDITION TO THE SOURCE OF THE MISSISSIPPI IN 1832.

The title of this work is as follows: "*Narrative of an Expedition through the Upper Mississippi to Itasca Lake, the actual source of this river, embracing an exploration through the St. Croix and Burntwood (or Brule) rivers, in* 1832, *under the direction of Henry R. Schoolcraft. New York: Published by Harper & Brother, No.* 82 *Cliff street.*—1834." This book is embellished by "A sketch of the sources of the Mississippi river, drawn from Lieutenant Allen's observations in 1832, to illustrate Schoolcraft's inland journey to Itasca lake, in two sheets, on a scale of about 11 miles to an inch."

Mr. Schoolcraft's object on the expedition, in 1832, was to attempt a reconciliation of the difficulties between the Chippeway and Sioux Indians. The routes he pursued were nearly those mapped by Lieutenant Allen, as already described.

In the same book is a brief account of Mr. Schoolcraft's examinations, in 1831, (in connexion with his duties in relation to Indian affairs,) of the country between Lake Superior and the Mississippi. His route lay up the Mauvaise or Bad river to its source, and thence down the Chippeway to its mouth.

Mr. Schoolcraft had also accompanied General Lewis Cass in his expedition to the sources of the Mississippi in 1820, at which time the highest point reached was the lake called Red Cedar by Pike, but since generally known as Cass lake.

Mr. Schoolcraft published a beautiful description of this expedition, called "*Narrative Journal of Travels from Detroit, northwest through the great chain of American Lakes, to the sources of the Mississippi river, in the year* 1820. *By Henry R. Scooolcraft. Albany: Published by E. & E. Hosford.*—1821." It is accompanied by a map on a scale of 65 miles to an inch, exhibiting the region bounded by the 1st and 21st meridians west from Washington, and the 41st and 51st parallels.

The Misissippi river, whose extreme sources Messrs. Allen and Schoolcraft have the honor of first exploring, was discovered by Hernando de Soto, who reached its banks probably near Memphis, in 1541. Father Marquette and Sieur Joilet first saw it in 1673. Father Hennepin visited it in 1680, and named the St. Peter's river and the Falls of St. Anthony. The mouth was discovered in 1683 by the Sieur La Salle, who sailed down the Illinois river to the Mississippi, and navigated it to the Gulf of Mexico. M. Le Sueur visited it probably as early as 1695, at which time he discovered the blue earth on the St. Peter's. In 1702 he floated two thousand pounds of this material to the mouth of the Mississippi. These statements in regard to the discovery of the Mississippi I have taken principally from Mr. Keating's narrative of Major Long's expedition to the sources of the St. Peter's river.

We are indebted to Captain Jonathan Carver, who visited the Upper Mississippi in 1766–'68, for much of our early knowledge of the Upper Mississippi valley, although some of his statements must be received with caution. He claims to have first conceived the idea of

passing from the sources of the Missouri to the Pacific Ocean. An expedition to this effect was actually fitted out by the aid of Mr. Whitworth, when the growing troubles of the colonies with the mother country led to its abandonment.

Mr. Schoolcraft says, in his introductory observations on the sources of the Mississippi, that "American geography may be said to have had three important problems to solve in modern times. The first and second of these related to the source of the Missouri and the course and termination of the Columbia. Both were substantially resolved by the expedition of Lewis and Clarke, under the administration of Jefferson," &c. "The true source of the Mississippi, which forms the third topic of inquiry, was brought into discussion at the same period." Messrs. Allen and Schoolcraft resolved this third important problem, so that it might seem, according to Mr. Schoolcraft, that American geography had no more problems to solve. Lewis and Clarke did probably determine the source of the Missouri, although it is yet a question if the Yellowstone river, with its affluent, the Bighorn, may not be a still more distant source. The character of the Missouri below the mouth of the Yellowstone is, however, so similar to that above, and so different from the Yellowstone itself, that the name of the main river was properly given to the branch which now bears it. Of the Columbia, however, Lewis and Clarke determined but little, and that only below the junction of Lewis' Fork. Its source, even to this day, is undetermined by any accurate exploration. But if these were the *great* problems of modern American geography, surely there were more than three. The sources of the Rio Grande del Norte, of the Yellowstone, of the Great Colorado of the West, might have been considered of equal importance, and the discovery since of large lakes of salt water, of large basins and long rivers with no outlets to the ocean, show that the field was not yet deprived of objects of great geographical interest.

A. FINLEY'S MAP OF NORTH AMERICA: PHILADELPHIA, 1826.

I give herewith a reduced copy of a portion of this map (Plate III) which purports to include "all the recent geographical discoveries" up to that date. On this we see Rio los Mongos and Rio Timpanogos flowing from Lake Timpanogos to the Pacific, from near the true position of Great Salt Lake, and the Rio Buenaventura flowing from Lake Salado to the Pacific. At what time and for what reason these rivers gained a place on the maps of that period I am not acquainted. The Multonomah (Willamette) is still represented as heading to the east of the Cascade range. This map shows that no advancement had been made in accurate knowledge of the regions west of the Rocky mountains since the exploration of Lewis and Clarke.

CHAPTER II.

EXPLORATIONS FROM A. D. 1832 TO A. D. 1844.

CAPTAIN BONNEVILLE, U. S. A., EXPEDITION, 1832 TO 1836.—DISCOVERY OF GREAT SALT LAKE AND HUMBOLDT RIVER.—IRVING'S ASTORIA.—LIEUTENANT E. STERN, U. S. A., MAP, 1835.—TOPOGRAPHICAL BUREAU, MAP OF WESTERN FRONTIER, 1837.—C. DIMMOCK, C. E., SURVEY, 1838.—CAPTAIN W. HOOD, T. E., MEMOIR AND MAP, 1839—TOPOGRAPHICAL BUREAU, MAP OF OREGON, 1838.—SURVEY BOUNDARY, LOUISIANA AND TEXAS, 1840.—COMMANDER WILKES, U. S. N , MAP OF OREGON, 1841.—KENDALL'S SANTA FE EXPEDITION, 1841.—PROFESSOR NICOLLET'S EXPLORATION AND MAP, 1835–'40.—LIEUTENANT J. C. FREMONT, T E., EXPLORATION, 1842.—CAPTAIN N. BOONE, U. S. A., EXPEDITION, 1843.—CAPTAIN J. ALLEN, U. S. A., EXPEDITION, 1843.—TOPOGRAPHICAL BUREAU, MAP OF TEXAS, 1844.—GREGG'S COMMERCE OF THE PRAIRIES, 1844.

BONNEVILLE'S EXPEDITION TO ROCKY MOUNTAINS, 1832–'33,–'34,–'35,–'36.

THE narrative I have perused is entitled "*The Rocky Mountains; or, Scenes, Incidents, and Adventures in the Far West; digested from the Journal of Captain B. L. E. Bonneville, of the army of the United States, and illustrated from various other sources. By Washington Irving. In two volumes. Philadelphia: Carey, Lea & Blanchard.*—1837." This is accompanied by two maps: one on a scale of twenty-three miles to an inch, showing the sources of the Missouri, Yellowstone, Platte, Green, Bear, Snake, and Salmon rivers, and a portion of Lake Bonneville, (Great Salt lake;) the other, on a scale of fifty miles to an inch, giving the country from the Rocky mountains to the Pacific, between the parallels of 38° and 49° north latitude.

Captain Bonneville's explorations were made in prosecution of the fur trade, which was his principal object, and very great accuracy in the map is not, therefore, to be expected. His letter of instructions, from Major General Macomb, dated Washington, August 3, 1831, contains the following directions: "The leave of absence which you have asked, for the purpose of enabling you to carry into execution your design of exploring the country to the Rocky mountains and beyond, * * * * has been duly considered and submitted to the War Department for approval, and has been sanctioned. You are, therefore, authorized to be absent from the army till October, 1833. It is understood that the government is to be at no expense in reference to your proposed expedition, it having originated with yourself. * * * * You will, naturally, in preparing yourself for the expedition, provide suitable instruments."

On the 1st of May, 1832, Captain Bonneville, with a train of wagons, took his departure from Fort Osage, and proceeded up the Missouri to the mouth of the Kansas. Crossing this stream, he followed very nearly the present travelled road to the Platte, thence along this river to the forks, and up the South Fork for two days. Here ferrying his party over, he struck across to the North Fork, followed it to the Sweetwater, and thence up that stream to its source in the South Pass. From this point he proceeded northwesterly to Green river, where he established his grand depot, near the mouth of Horse creek, and abandoned his wagons.* Having organized several hunting parties, he proceeded towards the northwest along the upper sources of Green and Snake rivers, until he reached Salmon river. The winter was passed on the upper portion of this stream and in travelling over the Great Lava plain or Shoshonee valley between it and the Snake river. In the spring a grand rendezvous was held at the

* There were at this time two rival companies trading in this region—the American Fur Company and the Rocky Mountain Fur Company—both having their principal rendezvous at "Pierre's Hole," in the valley of Pierre's river, an affluent of Snake or Lewis' river.

caches, in the Green River valley. Having made his arrangements for the year, he visited the Great Salt lake, and saw its northern portions. "To have this lake properly explored and all its secrets revealed was the grand scheme of the captain for the present year. * * * * * This momentous undertaking he confided to Mr. Walker, in whose experience and ability he had great confidence." "He instructed him to keep along the shores of the lake, and trap in all the streams on his route. He was also to keep a journal and minutely to record the events of his journey and everything curious or interesting, and make maps or charts of his route and of the surrounding country." No pains nor expense were spared in fitting out this party, which was composed of forty men. They had complete supplies for a year, and were to meet Captain Bonneville in the ensuing summer in the valley of Bear river, the largest tributary of Salt lake.

This party endeavored to proceed south over the great barren salt plain lying to the west of the lake, but their sufferings became so great, and the danger of perishing so imminent, that they abandoned the proposed route, and struck to the northwest for some snowy mountains in the distance. Thus they came upon Ogden's (Humboldt) river, and followed down it to the "sinks," or place where it loses itself in the sand. Continuing on, they crossed the Sierra Nevada, in which they were entangled for 23 days, suffering very much from hunger, and finally reached the waters of the Sacramento; thence turning south they stopped at the Mission of Monterey. After a considerable sojourn the party started to return. Instead of retracing their steps through the Sierra Nevada, they passed round its southern extremity, and crossing a range of low hills, found themselves in the sandy plains south of Ogden's river, where they again suffered grievously from want of water. On this journey they encountered some Mexicans, two of whom accompanied them to the rendezvous appointed by Captain Bonneville. The return route of this party probably was nearly that taken by Captain Frémont in 1842, and known as the Santa Fé trail to California. They thus travelled quite around the Great Basin system.

While this expedition was in progress, Captain Bonneville made an excursion to the head-waters of the Yellowstone. Leaving Green river he moved east to the sources of the Sweet-water, so as to turn the Wind River mountains at their southeast extremity; thence, striking the head of the Popo Agie, he passed down it to Wind river, which he followed through the gap of the Little Horn mountains, and through the Big Horn range. Below these mountains the river becomes navigable for canoes, and takes the name of the Big Horn river. From this point he returned to Wind river and attempted to cross the Wind River mountains direct to his caches on Green river. In this he was foiled by the chasms and precipices and compelled to take his former route around their southeastern extremity. From the depot he went up to the sources of Green river, crossed the mountains between its source and that of Wind river, and again returned to Green river by the Sweetwater. He then passed over the mountains to the Bear River valley, and thence to the Port Neuf river, where he established his winter quarters.

During the winter he started to visit the Columbia, passing down the Snake River valley, through the Grand Ronde and over the Blue mountains, to Walla-Walla. He returned to Bear river in the succeeding June. On the 3d of July, 1834, he made a second visit to the Columbia, and returned to spend the winter on Bear river. In 1835 he returned home* by way of the Platte river.

* Captain Bonneville's long-continued absence after the expiration of his leave, during which time no news was received from him at the War Department, led to his name being dropped from the Army Register. He was, however, restored, and now holds the commission of colonel of the third infantry.

Captain Bonneville's maps, which accompany the edition of Irving's work, published by Carey, Lea & Blanchard, in 1837, (the later editions generally do not give the original maps,) are the first to correctly represent the hydrography of this region west of the Rocky mountains. Although the geographical positions are not accurate, yet the existence of the great interior basins, without outlets to the ocean, of Great Salt lake, of Mary's or Ogden's river, (named afterwards Humboldt by Captain Frémont,) of the Mud lakes, and of Sevier river and lake, *was determined* by Captain Bonneville's maps, and they proved the non-existence of the Rio Buenaventura and of other hypothetical rivers. They reduced the Wallamuth or Multonomah (Willamette) river to its proper length, and fixed approximately its source, and determined the general extent and direction of the Sacramento and San Joaquin rivers. The map of the sources of the Yellowstone is still the best original one of that region.

As there is no name on the published map to show by whom it was constructed, I wrote to Colonel Bonneville in relation thereto, enclosing him a copy of the map. I make the following extracts from his reply:

"GILA RIVER, N. M., *August* 24, 1857.

"DEAR SIR: I thank you for your desire to do me justice as regards my map and explorations in the Rocky mountains. I started for the mountains in 1832. * * * * I left the mountains in July, 1836. and reached Fort Leavenworth, Missouri, the 6th of August following. During all this time I kept good account of the course and distances, with occasional observations with my quadrant and Dolland's reflecting telescope. * * * * * I plotted my work, found it proved, and made it into three parts: one a map of the waters running east to the Missouri State line; a second of the mountain region itself; and a third, which appears to be the one you have sent me, of the waters running west. On the map you send I recognize my names of rivers, of Indian tribes, observations, Mary's or Maria's river, running southwest, ending in a long chain of flat lakes, never before on any map, and the record of the battle between my party and the Indians, when twenty-five were killed. This party clambered over the California range, were lost in it for twenty days, and entered the open locality to the west, not far from Monterey, where they wintered. In the spring they went south from Monterey, and turned the southern point of the California range to enter the Great Western Basin. On all the maps of those days the Great Salt lake had two great outlets to the Pacific Ocean: one of these was the Buenaventura river, which was supposed to head there; the name of the other I do not recollect. It was from my explorations and those of my party alone that it was ascertained that this lake had no outlet; that the California range *basined* all the waters of its eastern slope without further outlet; that the Buenaventura and all other California streams drained only the western slope. It was for this reason that Mr. W. Irving named the salt lake after me, and he believed I was fairly entitled to it. The Great Lava plain was never known as such; until my report drew attention to its character, it was even confidently asserted that there was no prismatic basalt columns in that region. I saw it perfectly formed once only, and this on Snake river, below Gun creek. The Three Buttes have often been my camping ground. I wintered once on Salmon river, by my observation 45° 50′ 24″ north latitude. It was from my observations and plotting that the headwaters of Snake river, of the Columbia, Muscle Shell, and Yellowstone; headwaters of the Missouri and Sweetwater, of the Platte, and those of the Colorado of the West, were brought together in one view, as reported in my journal;

before this these heads of rivers were scattered far and wide. I gave Mr. Washington Irving the three maps I mention; and as the publication was by Carey, Lea & Blanchard, the originals may, perhaps, be found with them. The earliest editions have maps of my making. The one you refer to me I have no doubt is one of the three maps I made.

"Yours, &c.,

"B. L. E. BONNEVILLE,

"*Colonel 3d Infantry.*

"Lieut. G. K. WARREN, *Topographical Engineers.*"

A reduced copy of the map of the Great Basin and sources of the Yellowstone are given with this memoir. Application was made to Mr. Irving and to the publishers of the work to obtain, if possible, the original maps, but they could not be found, as so considerable a period had elapsed that they had been lost or mislaid.

Colonel Benton, in his "Thirty Years' View," page 580, says of Frémont's second expedition: "He was at Fort Vancouver, guest of the hospitable Dr. McLaughlin, governor of the British Hudson Bay Fur Company, and obtained from him all possible information upon his intended line of return, faithfully given, but which proved to be disastrously erroneous in its leading and governing feature." * * * * "All maps up to that time had shown this region traversed from east to west, from the base of the Rocky mountains to the bay of San Francisco, by a great river called the *Buenaventura*, which may be translated the *good chance.* Frémont believed in it, and his plan was to reach it before the dead of winter, and then hibernate upon it."

It is evident that Colonel Benton had never seen Captain Bonneville's map, or he would not have written this paragraph.

EARLY DISCOVERIES IN THE GREAT BASIN.

The exploration of the Great Salt lake was a favorite object with Captain Bonneville; though called Lake Bonneville by Mr. Irving, its existence was well known to the traders and trappers on his arrival in that country, as was also that of the Ogden's or Mary's river. A short account of the first discoveries in this region may not be inappropriate in this place.

In Captain Stansbury's report, page 151, he says: "The existence of a large lake of salt water, somewhere amid the wilds west of the Rocky mountains, seems to have been known, vaguely, as long as 150 years since. As early as 1689 the Baron la Hontan * * * wrote an account of discoveries in this region, which was published in the English language in 1735." This narrative of La Hontan of his journey up "La Rivière Longue," flowing into the Mississippi from the west, has for more than a century been considered fabulous. It is spoken of even by Captain Stansbury as an "imaginative voyage up this most imaginary river," up which La Hontan claims to have sailed for six weeks without reaching the source. During this voyage he learned from four Mozeemlek slaves belonging to the Indians living on the river "that, at the distance of one hundred and fifty leagues from the place he then was, their principal river empties itself into a salt lake of 300 leagues in circumference, the mouth of which is two leagues broad; that the lower part of that river is adorned with six noble cities, surrounded with stone cemented with fat earth; that the houses of these cities have no roofs, but are open above, like a platform, as you see them drawn on the map; that, besides the above-mentioned cities, there are above a hundred towns, great and small, round that sort of sea, upon which they navigate with such boats as you see drawn on the map," &c.

Now, this description does not, in any particular, correspond with the Great Salt lake; and, if it was told by the savages to the Baron, might, with as much if not far greater propriety, be considered as referring to the Pacific ocean, with the Columbia flowing into it.

The story of La Hontan excited much speculation and received various additions in his day; and the lake finally became represented on the published English maps of as late date as 1826 (see Plate III) as being the source of two great navigable rivers flowing into the South Sea. Here it was that historians supposed the Aztecs were located before their migration to Mexico.

Father Escalante, in 1776, travelled from near Santa Fé, New Mexico, in a northwesterly direction, to the Great Colorado. After crossing it and passing to the southwest through the country near its western bank, he turned again to the southeast, recrossed the stream, and proceeded to the Gila. During this journey he probably was in the vicinity of Utah lake. He there met with Indians who told him of a lake to the north whose waters produced a burning sensation when they touched the skin.* This lake was perhaps the Great Salt lake; and its property of making a burning sensation when applied to the skin was probably the effect of the strong solution of salt which it contains. This lake was *not* visited by Father Escalante; and that which he represents on his map, and which is copied on Humboldt's New Spain as Lake Timpanogos, was probably what is now called Lake Utah, into which a stream flows called by the Indians Timpanogos river.

Being convinced that, down to the days of the American trappers, the Great Salt lake had never been seen by white men, nor definite knowledge about it obtained, I addressed a letter to Robert Campbell, esq., of St. Louis, a gentlemen well known for his acquaintance with the early Rocky mountain fur trade. The following is his reply:

"St. Louis, *April* 4, 1857.

"Dear Sir: Your favor of the 25th ultimo reached me at a very fortunate period to enable me to give you a satisfactory reply to your inquiry as to who was the first discoverer of the Great Salt lake. It happened that James Bridger and Samuel Tullock both met at my counting-room after a separation of eighteen years, and were bringing up reminiscences of the past when your letter reached me. I read it to them, and elicited the following facts:

"A party of beaver trappers who had ascended the Missouri with Henry and Ashley found themselves in pursuit of their occupation on Bear river, in *Cache* (or Willow) valley, where they wintered in the winter of 1824 and 1825; and in descending the course which Bear river ran, a bet was made between two of the party, and James Bridger was selected to follow the course of the river and determine the bet. This took him to where the river passes through the mountains, and there he discovered the Great Salt lake. He went to its margin and tasted the water, and on his return reported his discovery. The fact of the water being salt induced the belief that it was an arm of the Pacific ocean; but, in the spring of 1826, four men went in *skin* boats around it to discover if any streams containing beaver were to be found emptying into it, but returned with indifferent success.

"I went to the Willow or Cache valley in the spring of 1826, and found the party just returned from their exploration of the lake, and recollect their report that it was without any outlet.

"Mr. Tullock corroborates in every respect the statement of James Bridger, and both are men

* I have, by the assistance of Mr. Moreno, of the Spanish legation, examined a manuscript narrative of this journey of Escalante, now in Colonel Force's library.

of the strictest integrity and truthfulness. I have known both since 1826. *James Bridger was the first discoverer of Great Salt lake.*

"I am happy in being able to give you the information and of the character that you wished for.

"Your obedient servant,

"ROBERT CAMPBELL.

"Lieut. G. K. WARREN,

"*Topographical Engineers, Washington City.*

"P. S.—A party of the Hudson Bay Company trappers came to the same place in the summer of 1825, and met the party that had discovered the Salt lake that season."

"R. C."

The party of trappers from the Hudson Bay Company, referred to in the postscript to Mr. Campbell's letter, was under the enterprising leader, Mr. Peter Ogden, who discovered the Ogden's or Mary's river in 1825. One of Mr. Ogden's party took a woman for his wife from among the Indians found on this river, to whom the name of Mary was given. From this circumstance the stream came to be called Mary's river. It is also called Ogden's river, after its discoverer.

A portion of the Great Basin system was visited by Father Font as early as 1777, near the Mojave river, (which he called Rio de los Mortires.) He followed its course to the place where it sinks, and then travelled east, crossing the Colorado at the Mojave valleys, and kept on as far as the Moquis villages. A copy of his map was procured in California by Captain Ord, U. S. A., and is now on file in the Topographical Bureau.

IRVING'S ASTORIA.

"*Astoria, or Anecdotes of an Enterprise beyond the Rocky Mountains. By Washington Irving. Author's revised edition, complete in one volume. New York: G. P. Putnam.*—1849." It contains a reduced copy of Wilkes' map of Oregon, and is the only edition at my command.

This beautifully written book, published first, I believe, in 1836, contains an account of the voyages and journey performed by Mr. Astor's parties. One of these, under Messrs. Hunt and Crook, went, in 1811–'12, from the Arikaree village, on the Missouri, at the mouth of Grand or "Big river," westward, through the Black Hills and Big Horn mountains, to Wind river, and thence to the sources of the Snake or Lewis river, and down that stream to the Columbia. Very few persons have ever traversed these Black Hills, and this narrative, though vague, is the first one extant of a journey through them. On Lewis and Clarke's map these hills have a northwest trend, as they also have on the map compiled by Captain Hood in 1839. In both cases, however, this direction was given from reports and not examination. On Major Long's map of his first expedition their direction is placed nearly north. In Irving's Astoria, however, we find Chapter XXVI beginning thus: "Mr. Hunt and his party were now on the skirts of the Black Hills, or Black mountains as they are sometimes called, an extended chain lying about a hundred miles east of the Rocky mountains, and stretching, in a northeast direction, from the south fork of the Nebraska or Platte river to the great north bend of the Missouri." This is the authority that sustains the representation of these hills as it has been made on all the published maps of late years. I became convinced, by observation and investigation in Nebraska in 1855, (though the hills were only seen at a distance,) that their trend is northwest,

as represented by Lewis and Clarke, and have so indicated them on my map of military reconnaissances in the Dakota country. The examinations made by me in 1857 somewhat modified that representation as regards their extent and position, but confirmed it in relation to the direction.

MAP OF LIEUT. E. STEEN, U. S. DRAGOONS, 1835.

This map exhibits the country from the west boundary of Arkansas and Missouri to the Rocky mountains, between the 31st and 45th parallels, on a scale of twenty miles to an inch; it shows the route of the rangers, under Colonel Manny, in 1833, who made an excursion from Fort Gibson, westward, as far as the head of the Little river, and back, and of the routes of the dragoons, under Colonel Dodge, in 1834–'35.

The expedition under Colonel Dodge, in the summer of 1834, went into the country lying between the Red and Canadian rivers as far west probably as longitude 100° 30', some seventy miles west of the Witchita mountains. This expedition, the object of which was to visit the Camanches and Pawnee picts, was very disastrous to the troops. General Leavenworth died of fever, and many officers and men perished from disease produced by the summer heats, bad water, and malaria. The report of Colonel Dodge (the only official one which I have seen) gives very little topographical information, and it would be difficult to trace out the exact route of the party. The artist, Mr. Catlin, was with the command; and a glowing account of the sufferings they underwent, and the places visited, with sketches of scenes, can be seen in his work on the North American Indians.

Captain R. B. Marcy, U. S. A., has since explored all this section, and information concerning it can be found in his reports.

The expedition under Colonel Dodge, in 1835, started from Fort Leavenworth, proceeded up the Platte and South Fork to its source; then travelled south to the Arkansas, and returned by it and the Santa Fé road to Fort Leavenworth.

On the map of Lieutenant Steen the Cimarron river is represented as flowing into the Arkansas river, near the position of Fort Atkinson.

TOPOGRAPHICAL BUREAU MAP OF THE WESTERN FRONTIER, 1837.

This is "*A map illustrating the plan of the defences of the western and northwestern frontier, as proposed by Charles Gratiot, in his report of October* 31, 1837, *compiled in the United States Topographical Bureau, under the direction of Colonel J. J. Abert, United States Topographical Engineers, by W. Hood.*"

This map was published, (Senate document No. 65, 2d session 25th Congress,) on a scale of fifty miles to an inch. It embraces the territory of the United States from the Gulf of Mexico to the 45th parallel of north latitude, and from the Mississippi river west to near the 103d meridian.

New Orleans and St. Louis are both represented as being in longitude 90° 25'.

SURVEY OF C. DIMMOCK IN 1838.

This survey, made with chain and compass for a military road along the western borders of Arkansas and Missouri, between Fort Smith and Fort Leavenworth, is still valuable between Old Fort Scott and Fort Smith, as it has not here been replaced by the United States Land Office surveys.

TOPOGRAPHICAL BUREAU MAP OF OREGON, 1838.

The title of this is "*A map of the United States territory of Oregon west of the Rocky mountains, exhibiting the various trading depots or forts occupied by the British Hudson Bay Company connected with the western and northwestern fur trade, compiled in the Bureau of Topographical Engineers, from the latest authorities, under the direction of Colonel J. J. Abert, by Washington Hood,* 1838. *M. H. Stansbury, del.*"

This map accompanies the report of Mr. Linn. from "the select committee to which was referred a bill to authorize the President of the United States to occupy the Oregon Territory, submitted to the Senate," which report forms Senate document 470, 2d session 25th Congress.

The map is published on a scale of twenty-five miles to an inch, and embraces the territory of North America from the 38th to the 55th parallel west of the 102d meridian.

All of this map, between the 40th and 50th parallels, with some trifling changes, was published in Wyndham Robertson's work, entitled "Oregon, our Right and Title," &c., published in Washington, 1846.

It appears as if the map of Captain Bonneville was used in making this compilation, but that full credence was not given to his representations, for the Rio Buenaventura as well as Mary's river finds a place on it. In order to accommodate both, Mary's (Humboldt) river was placed too far north, and the lakes into which it sinks were omitted. A doubtful character was given to the representation of the Rio Buenaventura, and it was indicated as joining with the Sacramento river by a stream called "Deception river."

MEMOIR AND MAP BY CAPTAIN HOOD, 1839.

Captain Washington Hood, Topographical Engineers, while stationed on the Missouri frontier, compiled, in 1839, a map, on a scale of forty-two miles to an inch, of the country adjacent to the headwaters of the Missouri, the Yellowstone, the Salmon, the Lewis, and the Colorado, with various observations on the subject of the practicable passes or routes through the Rocky mountains to the Pacific, "from information obtained in frequent conversations with two highly intelligent trappers, William A. Walker, of Virginia, and Mr. Coates, of Missouri, who belonged originally to Captain Bonneville's party, but subsequently continued to roam the mountains as free trappers during six consecutive years; as also that derived from others, who were connected with surveys and expeditions as far to the westward as Santa Fé and Taos."

This map is correct in its main features, but neither it nor the notes were ever published. The Black Hills and Big Horn mountains are represented with a general northwest trend. He recommended a road to Oregon from the sources of the Big Shyenne through the Black Hills; thence westward, passing north of the Big Horn mountains and striking the Yellowstone near the mouth of Twenty-five-yard creek; thence crossing the mountains to the three forks of the Missouri; thence up the Jefferson Fork to its northern sources; thence over to the source of the Bitter Root river. Between the Black Hills and the Yellowstone this route has not yet been explored. From the Bitter Root river to the Pacific it has been fully explored by Governor Stevens.

Captain Hood erroneously puts down the Bitter Root as a source of the Salmon river.

SURVEY OF THE BOUNDARY BETWEEN LOUISIANA AND TEXAS IN 1840.

The journal of the commission will be found in Senate document No. 199, 2d session 27th Congress, and is accompanied by two maps: one, on a scale of one and a half mile to an inch,

gives the Sabine river; and the other, on a scale of four miles to an inch, represents the meridian boundary line between the Sabine and Red rivers, the initial point being the place where the Sabine is crossed by the parallel of 32° north latitude.

The surveys on the part of the United States of the portion north of the Sabine river were made by Lieutenant Colonel James Kearney, Lieutenant J. Edm. Blake, and Lieutenant L. Sitgreaves, Topographical Engineers; and along the Sabine river by Major J. D. Graham, Lieutenant T. J. Lee, and Lieutenant G. G. Meade, Topographical Engineers. The surveys on the part of Texas were by Messrs. P. J. Pellows, D. C. Webber, and A. B. Gray.

UNITED STATES EXPLORING EXPEDITION UNDER COMMANDER CHARLES WILKES, U. S. N.

"*Narrative of the United States Exploring Expedition during the years* 1838, 1839, 1840, 1841, *and* 1842, *by Charles Wilkes, U. S. N., commander of the expedition, member of the American Philosophical Society, &c., in five volumes, and an atlas. Philadelphia: Lea & Blanchard.*—1845." The map extends from the 40th to the 53d parallel, and from the 106th meridian to the Pacific, on a scale of about forty-eight miles to an inch.

This naval exploring expedition arrived in Oregon in 1841.

A party under Lieutenant Johnson started from Nisqually, crossed the Cascades near Mount Rainier, and reached the Columbia near the mouth of the Pisquose river. Crossing the Columbia, they proceeded to Fort Okinikaine, thence to the mouth of the Spokane, and thence north to Fort Colville. They then turned south, visited the Mission, and, continuing on, struck the Kooskoosky, about forty miles below where Lewis and Clarke struck it; thence they travelled to Fort Walla-Walla. From this point they returned to Nisqually by the valley of the Yakima river, crossing the Cascade mountains at its source.

The Columbia river was surveyed as far up as Walla-Walla, and a party was despatched up the valley of the Willamette, and thence to the sources of the Sacramento, down which they travelled to the bay of San Francisco.

KENDALL'S NARRATIVE—SANTA FÉ EXPEDITION, 1841.

"*Narrative of the Texan Santa Fé Expedition, comprising a description of a tour through Texas, and across the great southwestern prairies, the Camanche and Caygua hunting grounds, with an account of the sufferings from want of food, losses from hostile Indians, and final capture of the Texans, and their march as prisoners to the city of Mexico, with illustrations and a map. By George Wilkins Kendall; in two volumes. New York: Harper & Brother*, 82 *Cliff street*—1844" The map is on a scale of 45 miles to an inch, bounded on the north by the 38th parallel, on the east by the 91st meridian, on the south by the 19th parallel, and on the west by the 103d meridian.

This expedition left Austin, the capital of Texas, on the 21st of June, 1841. Mr. Kendall, the author of the Narrative, accompanied the expedition from motives of mere curiosity and a desire of travel, being fully impressed with the idea that it was entirely a commercial expedition, and not one that would render null his passport received from the Mexican consul at New Orleans. The entire military force consisted of six companies, averaging 40 men each. There was a large train of wagons containing the property of merchants who accompanied the expedition to trade at Santa Fé. The whole party was under the command of General McLeod. Leaving Austin, they travelled north, crossed the Brazos at the Cross Timbers, and thence turning westward struck the Big Wichita, which they thought was Red river. They entered upon

the Llano Estacado at the head of the main Red river. The party was here divided in two portions—the one under Colonel Cooke proceeding rapidly in advance, and General McLeod following more slowly with the main train. The pioneers of the advance guard travelled northwest, and struck the Canadian at the Arroyo de Truxillo; thence they followed up its valley to the Santa Fé and Independence road, which led them to Anton Chico. Some Mexicans were sent back as guides to Colonel Cooke, and he was led by the way of Tucumcari Hill along the road generally pursued by emigrants, near the Canadian river, to New Mexico.

In the meantime, Mr. Kendall and his companions were made prisoners by the Mexicans, as also was Colonel Cooke upon his arrival at Anton Chico. While imprisoned in San Miguel, awaiting the arrival of General Armijo, they learned that he had captured General McLeod and his whole command at the Laguna Colorado. This expedition, it is thought, may have been the first to visit the sources of Red river, but it furnished no topographical information which could be accurately represented upon a map.

I. N. NICOLLET'S EXPLORATIONS, 1836, 1837, 1838, 1839, and 1840.

This report and map was printed by the Senate, document No. 237, 26th Congress, 2d session: the title being "*Report intended to illustrate a map of the Hydrographical Basin of the Upper Mississippi river, made by I. N. Nicollet while in employ under the Bureau of the Corps of Topographical Engineers. February* 16, 1841.—*Ordered to be printed, and* 200 *additional copies for the use of the Senate. Washington: Blair & Rives, printers.*—1843." The map accompanying this document is on a scale of 1 to 1,200,000. "Reduced and compiled, under the direction of Colonel J. J. Abert, in the Bureau of Topographical Engineers, by Lieut. W. H. Emory, from the map published in 1842, and from other authorities in 1843."

The map published in 1842 was on a scale of 1 to 600,000, and bore the title of "Map of the Hydrographical Basin of the Upper Mississippi river, from astronomical and barometrical observations, surveys, and information, by I. N. Nicollet, made in the years 1836, 1837, 1838, 1839, and 1840; assisted in 1838, 1839, and 1840, by Lieutenant J. C. Frémont of the Corps of Topographical Engineers, and authorized by the War Department." Both of these maps comprised the valley of the Mississippi and country adjacent, from the parallel of 38° to 48° 30′ north, between the 89th and 101st meridians west from Greenwich, and contained, in addition to the results of Mr. Nicollet's own observations and determinations, a compilation of nearly all previous authentic explorations within these limits.

Mr. Nicollet says, in his introduction, that "having come to this country for the purpose of making a scientific tour, and with a view of contributing to the progressive increase of knowledge in the physical geography of North America, I determined, after having explored the Allegany range in its various extension through the southern States, and having ascended the Red river, Arkansas river, and to a long distance the Missouri river, to undertake the full exploration of the Mississippi river from its mouth to its very sources. During the five years that I was engaged in these excursions, I took occasion to make numerous observations calculated to lay the foundation of the astronomical and physical geography of a large extent of country, and more especially of the great and interesting region between the Falls of St. Anthony and the sources of the Mississippi. With these labors I connected, also, the study of the customs, habits, manners, and languages of the several Indian nations that occupy this vast region of country. At the expiration of this long (and I found it an arduous) journey, I returned to Baltimore among my good friends of St. Mary's College, where I soon received a

flattering invitation from the War Department and Topographical Bureau to repair to Washington. The result of my travels was made known to these departments, upon which they thought proper to intrust me with the command of an expedition to enable me to complete, to the greatest advantage, a scheme which I had already projected on my visit to the far west, namely, the construction of a geographical and topographical map of the country explored." This was in the spring of 1838.

The years 1838 and 1839 were spent in explorations in Minnesota, assisted by Lieut. Frémont. Mr. Nicollet had nearly completed the map, and written a portion of his report, when death put an end to his labors before he was enabled to finish it, or to revise what had been previously written. The report does not, therefore, do justice to the surveys, and it is impossible to specify the routes he pursued except for the years of 1836, 1838, and 1839, and somewhat imperfectly for these, even though I have consulted his original notes in the Topographical Bureau. The reconnaissances of these years are the ones which, topographically, have at present the greatest value, as nearly all the others made by him have since been replaced by more accurate surveys under the General Land Office. Wherever Mr. Nicollet went he was indefatigable in the use of the telescope for observing occultations and eclipses, and of the sextant, with which he was very skilful; with these, a pocket chronometer, artificial horizon of mercury, and barometer, he obtained results possessing remarkable accuracy for the means employed.

On the 26th of July, 1836, Mr. Nicollet started from St. Peter's, near Fort Snelling, and ascended the Mississippi to the mouth of Crow Wing river. Leaving the latter stream at the distance of three miles from its mouth, he ascended the Gayashk or Gull river, passed across the lake of this name, and proceeded as far as Pine river, taking occasion to visit Lake Kadikomeg, (White Fish lake;) then ascending the east fork of Pine river, he reached the Kwiwison, or Little Boy river, which he descended through a succession of lakes and over small rapids to Leech lake. After crossing several small lakes, he reached the one called Kabekona; following up the river of this name to its source, he made a short portage of five miles, which brought him to the river La Place, which he ascended to Assawe lake. From this point he crossed over to Lake Itasca, and examined in detail the streams that fall into it, and determined the one which "is truly the infant Mississippi." Mr. Nicollet's astronomical observations determined the position of these sources as they are now laid down on our maps. From Itasca lake he descended the Mississippi to Fort Snelling, where he spent the winter.

In 1837 Mr. Nicollet was engaged in making examinations near Fort Snelling, and on an excursion to the northeast by way of the St. Croix river to Madeline island; thence to Fond du Lac, and up the St. Louis river to the portage across to Sandy lake; thence he returned to the mouth of the Saint Peter's.

In 1838 Mr. Nicollet, now for the first time in the service of the government, started from Fort Snelling, accompanied by Lieut. Frémont; they ascended the St. Peter's or Minnesota river to the mouth of the Waraju, and passed up the valley of this river to its source in the Côteau du Prairie. Continuing to the westward, they examined the source of the Des Moines river, and the Indian red pipe stone quarry; thence turning north they examined Lake Benton; travelling west from this point they struck the Big Sioux river, crossed over and examined Lakes Ti-tanka-he, Preston, Poinsett, and Abert; and leaving the Big Sioux again at the mouth of Redwood creek, took a northeasterly course to Lake Tizaptonan; thence they proceeded down the Intpah to Lac qui Parle. They now ascended the St. Peter's to the Manka Re Osey

river. Here they turned westward along this stream, passing from it to the source of the first fork of the Izuzah river in the Côteau du Prairie, and thence north to the sources of the Second and Third forks; the latter they followed to the Izuzah, whence they crossed over to Big Stone lake. They also examined Lac Traverse, and returned to Fort Snelling by the St. Peter's river. Mr. Nicollet placed the source of the Big Sioux (which he did not visit) about twenty-five miles too far north; it is now known to head in Lake Kampeska.

Mr. Nicollet and Lieutenant Frémont again started from St. Louis on board the American Fur Company's steamer Antelope, April 4, 1839, bound for Fort Pierre, at which place they arrived June 12. The course of the river was sketched throughout most of the distance as the boat ascended. Their design being to explore Miniwakan lake, a party was organized at Fort Pierre. They took the field on the 2d of July, and proceeded in a northeast course, striking the Rivière à Jaques, or James river, at the old trading-houses called the "Oakwood Settlements." They explored the valley of James river as far north as Butte aux Os, or Bone Hill; thence they struck northeastwardly to the valley of the Shayenne Oju river. This valley they followed as far as the parallel of 47° 45′, when they crossed the stream and travelled northwest to Miniwakan or Devil's lake. Having examined all its shore except the north-west extremity, they returned to the Shayenne river, and crossed the high divide separating it from the Red river valley on the east. Travelling south near the sources of the west branches of Red river, they recrossed the Shayenne near latitude 46° 30′, and continuing in nearly the same direction passed the sources of Wild Rice river, and examined the numerous lakes about the head of the Côteau du Prairie. Falling upon the sources of the Izuzah river, they returned, by that stream and the St. Peter's river, to the settlements.

Mr. Nicollet was the first explorer who made much use of the barometer for obtaining the elevation of our great interior country above the sea. An abstract of the methods and principles by which he was governed in his explorations is given in his report, and have served as a guide to many subsequent explorers. His map was one of the greatest contributions ever made to American geography.

EXPLORATION OF LIEUTENANT J. C. FRÉMONT, TOPOGRAPHICAL ENGINEERS, IN 1842.

The report of this expedition is Senate document, No. 243, 27th Congress, 3d session, and is entitled "*An Exploration of the Country lying between the Missouri river and the Rocky Mountains, on the line of the Kansas and Great Platte rivers.*" It is illustrated by a map on a scale of 1 to 1,000,000, (nearly 16 miles to an inch,) embracing the country from the forks of the Platte to the South Pass, between the 43d and 45th parallels.

Lieutenant Frémont's party consisted of about 25 persons, all mounted, except eight, who drove the carts carrying their stores. He was assisted by the since well known topographer, Mr. Charles Preuss, and provided with chronometers, sextant, artificial horizon, telescope for observing occultations, and a barometer. He started from the mouth of the Kansas river in June, 1842, and proceeded up that stream as far as the Little Vermilion, whence he took a northwest course toward the Platte river, and reached it near the present location of Fort Kearny. Lieutenant Frémont then continued up the Platte to the forks. Here he divided his party, a portion going with Mr. Preuss along the North fork direct to Fort Laramie, while he, with the remainder, continued up the South fork to St. Vrain's fort; thence he proceeded north to Fort Laramie. From this fort he passed up the North fork of the Platte to the Sweet-water river, and up this to its source in the South Pass. He continued to the northwestward,

along the foot of the Wind River range, to the parallel of 43°, near which he ascended an elevated peak and determined its height (13,570 feet) with a barometer. It has since borne his name. From this point he returned, and on reaching the North Platte, attempted to descend the stream in a boat. After safely passing several frightful rapids, the boat was finally swamped, but without loss of life. The party then continued down the valley of the North Fork and main Platte to its mouth. Lieutenant Frémont made, throughout this journey, astronomical observations whenever circumstances permitted. His barometer was broken among the Wind River mountains.

EXPLORATION BY CAPTAIN N. BOONE, UNITED STATES DRAGOONS, 1843.

The manuscript copy of this map, report, and journal, I obtained from the files of the Adjutant General's Office, and it is exceedingly interesting as containing an account of a country almost unknown. The map is on a scale of 20 miles to an inch. It exhibits the country between the Arkansas and Canadian rivers as far west as the 100th meridian. It contains no meridians or parallels, as no astronomical observations were made. Captain Boone says "it is a map or rough sketch of the country, with the water courses running through it. The courses and distances are all estimated from point to point direct, and not according to the distance actually travelled during each day, as it was found impossible to note the courses and distances of the windings made during each day's march." This report is accompanied by a minute journal, covering 55 pages of letter paper, closely written, and is referred to by General Taylor, in transmitting it, as containing "much valuable and curious information, particularly in relation to the salt region on the Red fork of the Arkansas." The map and report have never been printed.*

The expedition started from Fort Gibson and proceeded up the left bank of the Arkansas to about ten miles above the Lower Red fork, thence crossed over to the right bank, proceeded up this side to the mouth of the Upper Red fork or Big Salt fork. The party next travelled westward about 60 miles in a straight line when it came upon Big Salt plain; thence it turned north to the Santa Fé trail, striking it on the headwaters of the Little Arkansas. It then proceeded west to the mouth of Walnut creek, and thence in a general direction nearly due south to the Canadian, (probably striking it about fifty miles east of the Antelope Hills.) Thence it followed down this stream, or its side branch, to the mouth of the North fork, and thence to Fort Gibson. Captain Boone became convinced during this exploration that the Cimarron is the source of the Red fork of the Arkansas.

EXPEDITION OF CAPTAIN J. ALLEN TO SOURCE OF DES MOINES RIVER, &c., 1843.

The report and journal of this expedition, form printed House Doc. No. 168, 1st session 29th Congress. No map was printed with this report. Captain Allen submitted a map of his route with it, concerning which he makes the following remarks: "For the actual route passed over I must refer to the accompanying map, which will show it more fully and completely than it could be made by any other description. The map was constructed by Lieutenant Potter, under my immediate direction, and the care of taking minute notes on the way, and the pains taken during its projection, by that officer to secure all the information within his reach,

*Though I am not aware that this map was ever published by the government, the principal topographical information which it contained was embraced in a map published by the Messrs. Harper, in 1847, entitled "Harper's Cereographic Map of the United States. By Samuel Breese, A. M."

will warrant me in saying that it gives a very correct delineation of the country passed over, as also the topography of other parts of this territory, perhaps the most accurate on record." The Adjutant General, R. Jones, in his letter transmitting this report to Secretary Marcy, says: "Instead of the map of the route accompanying the report, I submit the more perfect map of the Upper Mississippi by Nicollet, (from which Captain Allen's sketch no doubt was taken,) upon which the route of the troops under his command has been carefully traced in the Topographical Bureau. Should it be determined to publish Captain Allen's route, Colonel Abert is of opinion it would be best to use the plate prepared for Nicollet's map. This would be not only much less expensive, but would, probably, improve the original map, which is one of much value."

As this last course was not followed, I endeavored to obtain the original from the files of the Adjutant General's office, and ascertained that it had been loaned, in 1846, to the commission, of which Governor Parras was president, to make a treaty with the Winnebagoes, but that it had never been returned. On seeking it in the Indian Bureau, I was again unsuccessful, so that it has been probably lost. I was also unable to obtain the map that had been sent to the House of Representatives, as it could not be found there.

The expedition under Captain Allen consisted of J. S. Griffin, assistant surveyor; First Lieutenant P. Calhoun, 2d dragoons; Second Lieutenant P. Noble, 1st dragoons; Second Lieutenant Potter, 1st infantry, and 52 soldiers. Captain Allen was supplied "with a small imperfect sextant," and no chronometer.

The route of the party was from Fort Des Moines, up the west side of the Des Moines river, to the Iron Banks, and thence up the east bank to the extreme source in "the Lake of the Oaks." From this point the country was explored north for 37 miles, and thence east to the St. Peter's river. Returning to the source of the Des Moines, he marched his command due west to the Big Sioux river, and followed down it a distance of 159 miles to its mouth; thence he took the nearest practicable route back to Fort Des Moines.

A portion of this route along the Big Sioux has not been reconnoitred since.

TOPOGRAPHICAL BUREAU MAP OF TEXAS, 1844.

The title of this is "*Map of Texas and the countries adjacent, compiled in the Bureau of the Corps of Topographical Engineers, from the best authorities, for the State Department, under the direction of Colonel J. J. Abert, chief of the corps, by W. H. Emory, 1st lieutenant Topographical Engineers, War Department*, 1844," on a scale of about 70 miles to an inch.

This gave most of the information extant, at the date of compilation, respecting the country comprised between the Gulf of Mexico and the Mississippi river on the east to the Pacific ocean on the west, between the 22d and 42d parallels of north latitude. No mountains are indicated, except those enclosing the Rio Grande valley. A lake, in the approximate position of the Great Salt lake, is represented, and another one receiving the waters of Ogden's or Mary's river. There are no names on the lakes and rivers represented in these interior basins; but this compilation shows that the existence of these basins and lakes was, at that time, admitted as an established fact in the Topographical Bureau.

GREGG'S COMMERCE OF THE PRAIRIES, 1844.

The title page of this book is "*Commerce of the Prairies, or the Journal of a Santa Fè Trader, during eight expeditions across the Great Western Prairies, and a residence of nearly nine years in*

Northern Mexico, illustrated with maps and engravings. By Josiah Gregg, in two volumes. New York; Henry G. Langley, 8 Astor House.—1844."

The map which accompanies the book is on a scale of 57 miles to an inch, and embraces the country from the west boundary of Missouri, Arkansas, and Louisiana, to the 108th meridian. It is based on the map of Humboldt's New Spain, that of Major Long's first expedition, and that of the road survey of J. C. Brown along the Santa Fé trail, with such corrections and additions as Mr. Gregg's own observations suggested. It was one of the most useful maps of this region at that day. The book is an interesting and valuable description of all the then known portions of New Mexico, and of the country along the routes between Fort Leavenworth and Santa Fé, and between Santa Fé and Fort Smith.

CHAPTER III.

EXPLORATIONS FROM A. D. 1843 TO A. D. 1852.

CAPTAIN J. C. FREMONT, T. E., EXPLORATION, 1843–'44.—CAPTAIN J. C. FREMONT, EXPLORATION IN 1845–'46.—LIEUTENANT J. W. ABERT, T. E., RECONNAISSANCE, 1845.—LIEUTENANT W. B. FRANKLIN, T. E., RECONNAISSANCE, 1845.—BREVET MAJOR W. H. EMORY, T. E., RECONNAISSANCE, 1846–'47.—LIEUTENANT J. W. ABERT, T. E., RECONNAISSANCE, 1846–'47.—LIEUTENANT COLONEL P. ST. GEORGE COOKE, U. S. A., EXPEDITION, 1846–'47.—A. WISLIZENUS, M. D., EXAMINATION, 1846–'47.—BREVET CAPTAIN W. H. WARNER, T. E., RECONNAISSANCE, 1847–'48–'49.—LIEUTENANT G. H. DERBY, T. E , RECONNAISSANCE, 1849.—LIEUTENANT J. D. WEBSTER, T. E., SURVEY MOUTH OF RIO GRANDE, 1847.—LIEUTENANT J. H. SIMPSON, T. E., RECONNAISSANCE ALONG THE CANADIAN RIVER, 1849.—LIEUTENANT J. H. SIMPSON, T. E., RECONNAISSANCE NAVAJO COUNTRY, 1849.—CAPTAIN R. B. MARCY, U. S. A , EXPEDITION, 1849.—CAPTAIN H. STANSBURY, T. E., EXPEDITION TO GREAT SALT LAKE, 1849–'50.—MARCH OF RIFLE REGIMENT TO OREGON, 1849.—MAJOR WOOD, U. S. INF., AND CAPTAIN POPE, T. E., EXPEDITION TO RED RIVER, 1849.—BREVET LIEUTENANT COLONEL JOHNSON, T. E., RECONNAISSANCES IN TEXAS, 1849–'50–'51.—TOPOGRAPHICAL BUREAU MAP OF TERRITORY OF UNITED STATES WEST OF THE MISSISSIPPI, 1850.—R. H KERN, C. E., RECONNAISSANCE ON THE PECOS RIVER, 1850 —LIEUTENANT J. G. PARKE, T. E., MAP OF NEW MEXICO, 1851.—CAPTAIN SITGREAVES, T. E., AND LIEUTENANT WOODRUFF, T. E., BOUNDARY OF CREEK COUNTRY, 1850–'51.—CAPTAIN SITGREAVES, T. E., EXPEDITION TO ZUÑI AND COLORADO RIVERS, 1851.—LIEUTENANT G. H. DERBY, T. E., RECONNAISSANCE MOUTH OF COLORADO RIVER, 1851.—LIEUTENANT I. C. WOODRUFF, T. E , RECONNAISSANCE, 1852.—CAPTAIN R. B. MARCY, U. S. A., EXPEDITION TO SOURCES OF RED RIVER.

CAPTAIN J. C. FRÉMONT'S SECOND EXPLORATION, 1843 AND 1844.

The title of the printed report is "*Report of the Exploring Expedition to the Rocky Mountains in the year* 1842, *and to Oregon and North California in the years* 1843–'44. *By Brevet Captain J. C. Frêmont, of the Topographical Engineers, under the orders of Colonel J. J. Abert, chief of the Topographical Bureau; printed by order of the Senate of the United States. Washington: Gales & Seaton, printers.*—1845." Senate Doc. No. 174, 28th Congress, 2d session.

This book contains a reprint of the report of the exploration in 1842, and the accompanying map exhibits the routes followed during that expedition, as well as during the years 1843 and 1844. The longitudes given on this map and in this report (pp. 100 and 101) differ materially from those of the first report and map; the reason for the change being explained on page 321. The new map is on a scale of 32 miles to an inch, and is "strictly confined to what was seen and to what was necessary to show the face and character of the country." It was drawn by Charles Preuss, whose skill in sketching topography in the field and in representing it on the map has probably never been surpassed in this country. The map, which in most respects may serve for a model, exhibits also a profile, made from barometrical observations, drawn with a horizontal scale of 1 to 3,000,000, or 47.35 miles to an inch, and a vertical scale about 30 times greater or 8,500 feet to the inch.

A "topographical map of the road from Missouri to Oregon, commencing at the mouth of the Kanzas, in the Missouri river, and ending at the mouth of the Walla-Walla, in the Columbia, in seven sections, from the field notes and journal of Captain J. C. Frémont,* and from sketches and notes made on the ground by his assistant, Charles Preuss, compiled by Charles Preuss in 1846, by order of the Senate of the United States," forms a part of House Com. Report No. 145, second session 30th Congress. Its scale is 10 miles to the inch. It contains detailed topography and full notes of the route pursued by Captain Frémont

* Frémont did not receive his promotion to the rank of brevet captain until the termination of his second expedition.

(between the points named) in 1843, and is an excellent map for travellers. It is not, however, accurately constructed, according to the list of geographical positions given in Captain Frémont's report, and this should be borne in mind by compilers.

Throughout this lengthened exploration in the mountains and across the plains, Lieutenant Frémont made many astronomical observations, determining longitude by observing occultations and eclipses with a telescope and by chronometric differences, and latitudes by observing with sextants and artificial horizons. After the investigations necessary in compiling the map which accompanies this memoir, I may be permitted to add my testimony to the truth of Captain Frémont's assertion in his notice to the reader at the beginning of his report, "that the correctness of the longitudes and latitudes may well be relied upon." They contain only such errors of longitude as are inherent to results obtained from observations made with the instruments employed. A mercurial barometer was carried across the continent on the road to Oregon as far as the Blue mountains, where it was broken. The subsequent elevations on the route were determined by the temperature of boiling water.

The second expedition under Lieutenant Frémont left the town of Kansas on the 29th of May, 1843. The party consisted of twenty-nine men, all mounted, their stores, &c., being carried in twelve carts. He was assisted by Mr. Charles Preuss as topographer, Mr. Thomas Fitzpatrick as guide, and Mr. Theodore Talbot. The party proceeded up the Kansas river to the junction of the Smoky Hill and Republican Forks, and thence up the latter stream to a point about 270 miles from where they started.

Here Lieutenant Frémont divided his party, taking Mr. Preuss and a few men with him, and leaving the carts in charge of Mr. Fitzpatrick. The party under Lieutenant Frémont proceeded rapidly in advance, left the valley of the main stream, and keeping on the divide, between it and Soloman's Fork, continued their westward course. This brought them again to the Republican Fork, which they now crossed, passed the dividing ridge between it and the South fork of the Platte, and travelled up the valley of the latter to St. Vrain's Fort. Leaving this point, the party proceeded up the valley of the South fork of the Platte to where it issues from the mountains. Here they struck toward the east, crossing the sources of several tributaries of the South fork, one of which, Bijou creek, they followed to its source. From this point they travelled southward to Boiling Spring creek, and down this stream to its junction with the Arkansas. Lieutenant Frémont returned again to St. Vrain's Fort by the direct route up Boiling Spring creek, and was there joined by the party under Mr. Fitzpatrick.

The whole party now ascended the valley of the Cache à la Poudre creek, passing through the Black Hills by the narrow, rocky valley of that stream; thence over a rolling open country they wound around the north side of the Medicine Bow mountains, and passing by a rough road through the Medicine Bow Butte Pass, descended to the north fork of the Platte. Crossing this stream they attempted to take a direct route for the South Pass over the high plateau constituting the dividing ridge between the Atlantic and Pacific waters, but finding the country hilly, barren, and uninteresting, they turned northward to the valley of the Sweetwater river. Striking this stream twenty miles above Devil's Gate, they travelled up its valley to the South Pass, turned to the southwest, and followed the emigrant road to Oregon, along the course of the Big Sandy to its mouth. Crossing Green river, (the main branch of the Great Colorado of the west,) and reaching Black's Fork, about thirty-five miles above its junction with Green river, they travelled up its valley to near Bridger's Fort. Passing over a low ridge to the north, called by the trappers "Little Mountain," they now descended to one of the sources of

Ham's Fork, called the "Muddy," (Frémont calls Ham's Fork, Muddy Fork;) thence striking over to Ham's Fork, and ascending by a good road to the head of this stream, he next crossed the Bear mountains, a connecting ridge between the Utah or Bear River mountains and the Wind River chain of the Rocky mountains. This summit Lieutenant Frémont's barometrical observations indicate to be the highest on the road between the Mississippi river and the Pacific ocean. Descending into the valley of Bear river, the party followed it northward to Beer spring, at its most northerly point, and thence turned south down the river for about sixty-five miles. Here turning westward they followed one of its tributaries to its head, crossed a high rocky ridge, and descended into the valley of Roseaux or Reed creek, which they followed to Bear river. Lieutenant Frémont now attempted a descent of the latter stream in an India rubber boat, but failed, as the river separated into numerous sloughs and branches, rendering the navigation impossible. On the 6th of September this expedition first beheld the waters of the Great Salt Lake. Forming an encampment on Weber's Fork, Lieutenant Frémont made a hasty survey of the northern portion of the lake.

Turning back upon their former trail to the head of Reed creek, they crossed the dividing ridge between the waters of Bear river and Snake river, (Lewis' Fork of the Columbia,) at the source of Pannack river, and proceeded to Fort Hall. From this point they travelled down the left bank of Snake river over a rugged, difficult road, and crossed the stream at the emigrant ford below Fishing Falls. Keeping close to the mountains north of Snake river, and crossing its numerous small tributaries, they struck the Rivière Boisée, (sometimes called Reid's river,) and followed down its valley to Fort Boisée, near its mouth. Here they recrossed the Snake river, and travelled along its valley to the mouth of Burnt river, at which place Snake river turns north through deep and rocky cañons, said to be impassable for man or beast. Following up Burnt river to its source, they took a very rocky, dangerous road for wagons, which led them near the heads of several tributaries of Snake river, and finally across the Blue mountains to the source of the main fork of Umatillah river, a tributary of the Columbia. Descending along a mountain spur, they entered the valley of the Walla-Walla river, and followed it to its junction with the Columbia, where old Fort Walla-Walla or Fort Nez Percé was situated. Lieutenant Frémont now travelled down the valley of the Columbia to the Dalles, whence he descended the river with two canoes to Fort Vancouver.

Returning to the Dalles, he started on his homeward journey, having abandoned his carts for packs, the only wheel vehicle which he retained being a mountain howitzer. He states, as the projet for his return trip, to make an examination of Klamath lake; to go thence to the reputed site of the lake called "Mary's;" thence to Buenaventura river; thence to the mountains at the heads of the Arkansas river; and then down the Arkansas to Bent's Fort. He proceeded up the valley of Fall river (Des Chutes) until within a short distance of its head, where it turned into the mountains on the western side. Here he left it, and crossing a low and heavily timbered divide, came into the basin of Klamath lake. Thence the party travelled east, visiting Summer lake and Lake Abert. From the northern end of the latter they turned south, passing a chain of lakes with little or no dividing ridges. Continuing south, he entered the basin of the Mud lakes and Pyramid lake. Leaving Pyramid lake and Salmon Trout river, he travelled on, crossing Carson's and Walker's rivers, until finally, in about latitude 38° 20′, (being disappointed in not finding the Rio San Buenaventura, which for many days he had been "expecting to see with every stream,") he turned toward the west. After encountering great

hardships and perils, he succeeded in crossing the Sierra Nevada in the months of January and February, and proceeded to Neuva Helvetia, on the Sacramento river.

Leaving the Sacramento, Lieutenant Frémont travelled up the west side of the San Joaquin valley, following that stream to near its head; thence travelling around the eastern shore of the Tulare lakes, he crossed the Sierra Nevada mountains near their southern end by a "beautiful pass" now called Tah-ee-cha-pah. Skirting along the eastern face of the mountains, he struck the Spanish trail from Los Angeles to Santa Fé near the *Cajon* Pass. This trail he followed down the Mohave river to where it leaves this stream, and thence northeast to Sevier river; here he left it and travelled north to Utah lake.

Turning now to the east, up the Spanish Fork, he crossed the Wasatch mountains at the source of White river. Continuing on toward the east, he passed north of the sources of Uinta river, between it and the Uinta mountains, arrived at Green river and crossed it at "Brown's Hole."

Following the course of a small branch called Vermilion creek, the party crossed from its head to Elk Head river, went up this stream to St. Vrain Fork, followed it for a short distance, and then struck directly eastward, toward the summit of the dividing ridge between the waters of the Pacific and the Atlantic. They crossed the summit of the Rocky mountains at an elevation of 8,000 feet, near the head of Pullam's Fork of the Platte, and descended into the valley of this stream. For the purpose of examining the three parks and the three rivers that rise in them, Lieutenant Frémont now turned up the valley of the Platte, passing into the New Park or North Park by the narrow gorge or gate through which the north fork of the Platte forces its way. Keeping up the left bank of the Platte, and crossing several deep branches, he recrossed the divide between the waters flowing into the Atlantic and Pacific at an elevation of 9,000 feet, and, continuing to the south, crossed the Blue river near its forks in the southwestern edge of the Old or Middle Park. Thence going up the right hand fork, he again reached the summit of the divide between the Atlantic and the Pacific waters, and passed into the South Park or Bayou Salade, where the south fork of the Platte has its source. This last mentioned divide has an *estimated* height of 11,200 feet. Leaving the South Park, Lieutenant Frémont crossed the mountains which separate it from the Arkansas river and again reached the open plains.

From this point the expedition moved rapidly down the left bank of the Arkansas to twenty miles below Bent's old fort, turned northeasterly over an elevated prairie, and crossed a stream which Lieutenant Frémont considered a branch of Smoky Hill Fork, but which was probably Sandy creek of the Arkansas. On arriving at the head of Smoky Hill Fork, the party turned down its valley and continued along it to a point where the river bends northward to join with the Republican Fork. Here they left the river, and, continuing on their easterly course, struck the wagon road from Santa Fé to Independence, Missouri; and, on the last of July, 1844, encamped again at the little town of Kansas, on the left bank of the Missouri river.

EXPLORATIONS OF CAPT. J. C. FRÉMONT, 1845-'46.

A portion of the results of this were published by the United States Senate, 1st session 30th Congress, Mis. Doc. No. 148, entitled "*Geographical Memoir upon Upper California, in illustration of his Map of Oregon and California, by John C. Frémont, addressed to the Senate of the United States. Washington: Wendell & Van Benthuysen, printers.*" This is accompanied

by a map, drawn by Charles Preuss, on a scale of 1 to 3,000,000, embracing all the country between the 104th meridian and the Pacific ocean, and between the 32d and 50th parallels of north latitude. It was compiled from the surveys of Captain Frémont and "other authorities," and was at the time of its publication (1848) the most accurate map of that region extant.

A great deal of information in regard to this expedition, not contained in the memoir, has been published in the newspapers and in various pamphlets.

There are probably many reasons why a complete account of this third expedition, as well as Colonel Frémont's subsequent ones, has never been published; but this desideratum will probably be soon supplied.*

Captain Frémont started upon this exploration better provided than on his previous ones. He had under his command Lieutenants J. W. Abert and William G. Peck, Topographical Engineers, and was aided by Mr. Charles Preuss and Mr. E. M. Kern, as topographers and artists. He was provided with a portable astronomical transit instrument, sextants, chronometers, and barometers. No map or account has been published of his route East of Bent's Fort, but I believe it is nearly that by which he returned in 1844. He left the frontier of Missouri in May, and, on arriving at Bent's Fort, detached Lieutenants Abert and Peck to explore the sources of the Canadian river, and then to return to the States. The following account of his subsequent movements is principally taken from his memoir and map.

The party under Captain Frémont left Bent's Fort on the 16th of August, 1845, travelled up the Arkansas to the Utah Pass, at its source, and crossed the divide at the head of Piney creek, a branch of Blue river. Continuing west they crossed Blue river, reached the sources of White river, and travelled near it to its mouth. From the crossing of Green river they travelled up the left bank of the Uintah to Duchesne's Fork, intersecting Captain Frémont's trail of 1844 a short distance east of the point where it crossed that stream; thence they passed up Morin's Fork, crossed the divide between the waters of the Colorado river and those of the Great Salt lake, near the head of Timpanogos river, which they followed down to its junction with Utah lake. They passed around the northern end of that lake and down Utah river to the Great Salt lake, which was reached at the point where "Great Salt Lake aity" is now situated. Remaining here several days, Captain Frémont made astronomical observations and surveyed the lower portion of the lake, including Antelope island.

Leaving the southern shore of Great Salt Lake, they struck northwesterly to Pilot Peak, crossing, in so doing, two isolated ranges of mountains. Turning southwest from this point, they travelled about 50 or 60 miles to Whitton's Springs, where the party was divided. One portion, to which Mr. Kern was attached, and which was conducted by Walker, turned southwest, crossed the Humboldt River mountains near the head of Crane's branch of the south fork of the Humboldt, continued their southwesterly course, and crossed three distinct mountain masses before reaching Moore's creek, in latitude 38° 33′ 17″ W. From this place they proceeded to the rendezvous at Walker's lake.

The other party, under Captain Frémont, crossed the Humboldt River mountains by a good pass, and descended to the head of the north fork of Humboldt river. This stream had heretofore been named Ogden's or Mary's river. After following it down to what are called the "Sinks," they travelled southward, passing near the mountains, along the eastern shore of Carson's lake. They soon struck Walker's river near its mouth and rejoined the other party.

* In press, Colonel J. C. Frémont's Explorations, prepared by the author, and embracing all his expeditions.—Childs & Peterson, publishers, No. 602, Arch street, Philadelphia.

Separating once more, Mr. Kern, guided by Mr. Walker, proceeded south to the head of Owen's river, and travelled down its valley, at the foot of the eastern slope of the Sierra Nevada, to Owen's lake. Thence they travelled about 40 miles south to Walker's Pass, and crossed the summit to the head of Kern river, in the valley of which they camped to await the arrival of Captain Frémont's division.

Captain Frémont travelled northwesterly, crossed Carson's river at the same point as in the preceding year, and thence striking the Salmon Trout river, followed it to its head and passed the summit of the Sierra Nevada in latitude 39° 17′ 12″, being about 55 miles north of his pass of January 17, 1844. Descending thence the northern fork of American river, he reached New Helvetia.

Thence he proceeded south to Lake Fork or King's river, which he supposed, from Mr. Walker's description, to be the place where he would find him and Mr. Kern. "This stream he ascended and searched for a long time in a very rugged country, in many places covered with snow, but he could find no trace of the party, and, thinking they had gone to the settlements, he gave up the search and went to Monterey."

Messrs. Kern and Walker having waited on Kern river until their provisions were exhausted, gave up all hope of being joined there by Captain Frémont, and proceeded to Monterey, where they found him.

Captain Frémont, in the following spring, (March, 1846,) ascended the Sacramento as far as Fort Reading, crossed the mountains to the valley of Pit river, and, proceeding to the north, explored Upper or Great Klamath lake. On his return he visited many places along the coast as far south as San Diego, but his routes are not represented on the map or specified in his memoir. It is probable that the war with Mexico and the troubles between Americans and Mexicans in California, which began prior thereto, put a stop to his explorations beyond what could be obtained by ordinary observations in travelling from point to point during a period of violent hostilities.

During this expedition Captain Frémont obtained the longitude of the mouth of Fontaine qui Bouit; of the camp at Great Salt Lake; of Lassen's farm, on Deer creek; and of the Three Buttes, in Sacramento valley. The first two results have never been tested by any other observer with a good instrument, but are generally received as correct. The other two have been tested by land office surveys, and by Lieutenant Williamson's second Pacific railroad survey, connecting with the Coast Survey longitude of San Francisco. Both tests indicate that his results were close approximations to accuracy. These four determinations of Captain Frémont detected some errors in his previous map, amounting, in one instance, to 15′ in longitude, and which furnished the means for correcting them.

A note on Captain Frémont's map of routes of 1843–'44, gives the following descriptive information: "The Great Basin: Diameter 11° of latitude, 10° of longitude; elevation above the sea between four and five thousand feet; surrounded by lofty mountains; contents almost unknown, but believed to be filled with rivers and lakes which have no communication with the sea; deserts and oases which have never been explored, and savage tribes which no traveller has seen or described." This note, with the map and accompanying report, have conveyed the idea that this Basin is encircled by a ridge of mountains forming a *rim.* This was so represented on the map compiled by Mr. Preuss in 1848, and gave rise to the belief in the existence of two long ridges running east and west, lying on the north and south of the basin, which, however, by that time, had been much reduced in extent.

RECONNAISSANCE BY LIEUT. JAMES W. ABERT, TOPOGRAPHICAL ENGINEERS, 1845.

This report forms Senate Doc. No. 438, 29th Congress, 1st session, and is accompanied by a map on a scale of about 32 miles to an inch, embracing the country from the 94th meridian to the Rocky mountains, and between the Platte river and the 35th parallel.

Lieutenant J. W. Abert, assisted by Lieutenant William G. Peck, Topographical Engineers, having been detached at Bent's Fort by Captain Frémont, in 1845, with instructions from him to explore the Purgatory creek, the Canadian and False Washita rivers, left that fort on the Arkansas on the 15th of August, 1845, with a party of 30 men, four wagons, and 63 horses and mules. They were supplied with a chronometer and sextant. They travelled down the Arkansas to the mouth of the Purgatory creek, and thence up that stream about 15 or 18 miles, when the cañons forced them to strike westward to Timpa creek, which they followed to its head. Travelling over a low divide, they again came to Purgatory creek, and followed it to the Raton Pass. Taking the Santa Fé road through this pass, they reached the sources of the Canadian, and followed down the banks of this river to about latitude 35° 50′. Here they crossed over to Utah creek, one of its tributaries, and followed this to its mouth. Keeping along the Canadian to the vicinity of Valley creek, they again left it and struck south to the sources of the north fork of Red river, which they supposed were those of the False Washita. Continuing along this fork, they travelled east some 70 miles, and took a northeast course to the Canadian, before reaching which, they crossed the head branches of the False Washita. They then travelled down the valley of the Canadian to Fort Gibson.

RECONNAISSANCE BY LIEUTENANT W. B FRANKLIN, TOPOGRAPHICAL ENGINEERS, 1845.

An abstract of Lieutenant Franklin's journal, and a reduced copy of his map, on a scale of 75 miles to an inch, were published in House Ex. Doc. No. 2, 1st sess. 29th Cong. The the title of the map is "Map of the Route pursued by the late Expedition under the command of Colonel S. W. Kearney, United States 1st dragoons, by W. B. Franklin, Lieutenant Topographical Engineers, attached to the expedition, 1845."

The original map is on a scale of 32 miles to an inch. The new information which it contained was published with Lieutenant Abert's map of his exploration, made in 1845, wherein credit is given to Lieutenant Franklin for the material taken from his map.

The expedition was under command of Colonel S. W. Kearny, United States 1st dragoons. It started from Fort Leavenworth for the South Pass, travelling on the usual road to Fort Kearny, thence up the Platte and South Fork to where the road crosses to the North Fork, at Ash Hollow, and thence up the North Fork and Sweetwater to the source of the latter. Returning to Fort Laramie, the expedition proceeded south along the Chugwater and Crow creeks to St. Vrain's Fort, and thence to the Arkansas, below the mouth of Boiling Spring creek. It returned along the Arkansas and Santa Fé road to Fort Leavenworth.

An account of the expedition is given in Lieutenant Colonel P. St. G. Cooke's late book of "Scenes and Adventures in the Army."

RECONNAISSANCE OF MAJOR WM. H. EMORY, TOPOGRAPHICAL ENGINEERS, 1846-'47.

The report forms a part of Senate Ex. Doc. No. 7, 1st session of 30th Congress, and is entitled "*Notes of a Military Reconnaissance from Fort Leavenworth, in Missouri, to San Diego, in California, including parts of the Arkansas, Del Norte, and Gila rivers. By Wm. H. Emory, Brevet Major Topographical Engineers, made in* 1846–'47, *with the advanced guard of the* '*Army*

of the West.' Washington: Wendell and Van Benthuysen, printers.—1848."* It is accompanied by a map, on a scale of about 24 miles to an inch, exhibiting only that portion of the country and the routes that came under the observation of the parties. The map contains also a barometrical profile of the route across the continent, on a horizontal scale of about 24 miles to an inch, and a vertical scale of about 8,200 feet to an inch, the vertical scale being about 15 times the horizontal. A report by Lieutenant Abert, of the portions of the route between Fort Leavenworth and Bent's Fort, is also appended. Major Emory (then a first lieutenant of Topographical Engineers) was assisted by Lieutenant W. H. Warner, Topographical Engineers, Lieutenant James W. Abert, Topographical Engineers, Lieutenant Wm. G. Peck, Topographical Engineers, Mr. J. M. Stanley, and Mr. Norman Bestor. His instruments were two box chronometers, two 8½-inch sextants, and one syphon barometer, which was the first mercurial barometer ever carried overland to the Pacific unbroken.

They started from Fort Leavenworth June 27, 1846, and, proceeding south, struck the Santa Fé road, which they followed to the bend of the Arkansas river, and thence up the valley to Bent's Fort, where they joined the column of the "Army of the West." From this place they travelled in a southerly direction, up the Timpa creek to its head, and thence through the Raton Pass near the head of Purgatory creek. After crossing the valleys of the tributaries of the Canadian, they struck the Gallinas river near its source, and thence travelled to the Pecos, crossed it at San Miguel, and followed up its valley to the old ruins of Pecos. They then passed over the Santa Fé mountains, by the pass at the head of the north fork of the Galisteo creek, and entered Santa Fé.

Lieutenants Abert and Peck did not accompany Lieutenant Emory beyond Santa Fé, instructions being given them to make certain explorations in the neighboring region.

From Santa Fé the army travelled down the valley of the Rio Grande del Norte 230 miles. At Fra Cristobal the command, separating from the wagon train, which took another route, crossed the dividing ridge "nearly on the 33d parallel," struck the Gila, and followed its valley to the Colorado of the Gulf of California; being sometimes forced, by cañons and ravines, to leave the river for short distances. Crossing the Colorado south of the mouth of the Gila, they travelled northwesterly over the Colorado desert, very nearly along the present wagon road, until, on the 5th of December, they crossed the summit of the Coast Range, through Warner's Pass. After much hard fighting with the Mexicans, they arrived at San Diego December 12, 1846, and here the principal reconnaissance terminated.

RECONNAISSANCE BY LIEUTENANTS ABERT AND PECK, 1846-'47.

The results of these explorations are given by Lieutenant Abert's report, which forms a part of House Ex. Doc. No. 41, 1st session 30th Congress. It is accompanied by a map, on a scale of 10 miles to an inch, exhibiting the portion of New Mexico between latitude 33° 30′ and 37°, and from the meridian of 104° 30′ to 108°. This map was also reduced and republished on Lieutenant Emory's map already described.

Lieutenants Abert and Peck commenced, on the 8th of October, the examination entrusted to them by Lieutenant Emory, after having previously visited certain mines. It does not appear that they were provided with any instruments for making astronomical observations, and the latitudes and longitudes used were those determined by Lieutenant Emory. They descended the Rio Grande to the Algodones, whence they made a short journey up the Rio Jemez and

* It was also published by the House of Representatives, House Ex. Doc. No. 41, 1st session 30th Congress.

back, and, continuing down the Rio Grande to Albuquerque, crossed the river. Striking over to the Puerco, they followed its valley to the Rio San José, and up that stream to the Pueblo Moquino, visiting also the pueblos of Laguna and Acoma, and the ruins of a deserted pueblo on the Rito, a branch of San José river. From this place they retraced their steps to Albuquerque, travelled down the east side of the Rio Grande as far as Peralta, and returned to Padillas.

From Padillas they travelled east up the "Cañon Infierno," through the Sierra Blanca, visited the towns of Chilili, Tegique, Torreon, Manzana, and Quarra, and returned by way of the ruins of Abo, to the Rio Grande, which they struck at "Casa Colorado." From here they proceeded down the river as far as the ruins of Valverde, at the northern end of the "Jornada del Muerto." At this place they crossed the river and returned to Albuquerque, passing through Saucilla, Las Lunas, Padillas, &c. From Albuquerque they proceeded up the San Antonio cañon to its head in the Sandia mountains; thence northward to the mine and town of Tuerto, and thence around the base of the Gold mountains to Santa Fé.

Leaving Santa Fé on the 28th December, Lieutenant Abert proceeded down the Pecos to San Miguel, and thence, by way of Las Vegas, over the same route pursued by Lieutenant Emory when entering New Mexico, to Bent's Fort, on the Arkansas. Thence he followed the usually travelled route down the Arkansas, from Santa Fé to Fort Leavenworth, which point he reached on March 1, 1847.

The survey of the Cimmaron route is not specially mentioned in either Major Emory's or Lieutenant Abert's report, and I give here an extract from a letter which I received from Lieutenant Peck, dated October 9, 1854, in relation to it: "The survey of the Cimmaron route was made by me on my return from Santa Fé, in the month of April, 1847. It is nothing but a reconnaissance, and was made in the same manner that all other reconnaissances have been made in that country, except that I had no means of establishing astronomical positions. The country is eminently favorable to a compass line, and I think it may give a fair idea of the route. * * * * The original map on which the plat first appeared is Emory's map of General Kearny's route to the Pacific. * * * * No report was made of the route, for the reason that I made the map on my own responsibility, and I did not consider it of sufficient importance to comment upon."

"From the Canadian to the Arkansas, the country is very nearly level, with scarce a stick of timber, immense quantities of sand, and very little water."

ROUTE OF COLONEL P. ST. G. COOKE, 1846-'47.

This officer's report forms a part of House Executive Document No. 41, 1st session 30th Congress, and is accompanied by a map of his route, on a scale of 12 miles to an inch; his route is also represented on Emory's map.

Colonel Cooke was sent by General Kearny from La Joya to Santa Fé, to take command of the "Mormon battalion," *en route* for California. Proceeding to that place, he assumed command, and, on the 19th October, 1846, led the battalion, consisting of about four hundred men, each company having three mule wagons, down the Rio Grande to a point about three or four miles above San Diego on that river. Thence he travelled southwest to Ojo de Vaca, crossing there the road from the Copper Mines to the Yanos. Thence, turning more south, he crossed the Sierra de los Animos one mile from the Guadalupe Pass, and, passing by the rancho de San Bernardino, on the head of the Yaqui river, struck the San Pedro river. He travelled this

stream 48 miles, and then turned northwest 48 miles, to the town of Tucson. From this place he continued on by the present route, near the Picacho de Tucson to the Pimas villages on the Gila; and thence down that stream to its junction with the Colorado. Crossing the Colorado at this point, he proceeded over the desert to Warner's Ranche, and thence to San Diego.

EXAMINATIONS BY A. WISLIZENUS, M. D., 1846–'47.

The account and results of this form Senate Mis. Doc. No. 26, 1st session 30th Congress, and are entitled: "*Memoir of a tour to Northern Mexico, connected with Colonel Doniphan's Expedition, in* 1846 *and* 1847. *By A. Wislizenus, M. D., with a scientific appendix, and three maps. Washington: Tippin & Streeper, printers.*—1848." These maps are, 1st, a map of the country from the 25th to the 39th parallel, between the 94th and 107th meridians, on a scale of 50 miles to an inch, exhibiting the topography of the route travelled over; 2d, a map or geological sketch of the same country, on a scale of 80 miles to an inch; and 3d, a barometrical profile of the route, on a horizontal scale of 36 miles to an inch, and a vertical scale of 2,000 feet to the inch, the vertical scale being 95 times the horizontal.

Dr. Wislizenus undertook this scientific tour at his private expense. Leaving St. Louis in the spring of 1846, he followed the Santa Fé road, by the Cimarron route, to Santa Fé. Thence he went down the Rio Grande valley to El Paso and Chihuahua. Here the derangement which the Mexican war produced kept him for six months "in a very passive condition." On Colonel Doniphan's arrival in that neighborhood, he accepted a situation in the medical department of the army, and returned with the troops, by way of Monterey, to the States.

EXPLORATION OF BREVET CAPTAIN W. H. WARNER, TOPOGRAPHICAL ENGINEERS, 1847–'48–'49.

Very little of the results of the exploration of Brevet Captain Warner, after he was relieved from duty with Major Emory, have been published. He made extensive examination of routes along the Pacific and in the Coast mountains, from San Diego to San Francisco, and had nearly completed his map of that then unknown section of country, when he was directed to make the exploration in the Sierra Nevada, on which he lost his life in an Indian ambuscade. His notes and papers passed into the possession of his assistant, Lieutenant Williamson, Topographical Engineers, and were thus available to him in his examinations made in 1853–'54, in connexion with a route for a railroad to the Pacific.

The only portion of Captain Warner's explorations, to my knowledge, of which a map and report were published, was that of his last expedition. This was prepared by Lieutenant Williamson, and forms a portion of Senate Ex. Doc. No. 47, 1st session 31st Congress. The map of the route is on a scale of 15 miles to an inch.

The party left Sacramento August 13, 1849, intending to survey as far as Humboldt river, for the purpose of finding a practicable railroad route through the Sierra Nevada. They ascended the Sacramento valley to Lassen's, on Deer creek, struck east across the mountains to the valley of Pit river, crossed it, and followed its northern bank to its source. The roughness of the route compelled them to abandon their wheel vehicles.

Being embarrassed by sickness, the want of able pack mules, and the lateness of the season, Captain Warner decided to take a party of nine men and proceed to the north, leaving about an equal number with the sick, in charge of Lieutenant Williamson, in camp on Goose lake. Arriving at Lake Abert, he turned the eastern branch of the Sierra Nevada, and travelled south over nearly the same route as Captain Frémont in 1844. In about latitude 42° Captain Warner

was surprised on the march by an ambush of Pit River Indians, and he and several of his party were killed. This rendered the further prosecution of the reconnaissance impossible, and Lieutenant Williamson returned to Benicia. Captain Warner's note books were saved, and from them a sketch of his route, with a report, was made by Lieutenant Williamson.

RECONNAISSANCE IN CALIFORNIA BY LIEUTENANT G. H. DERBY, TOPOGRAPHICAL ENGINEERS, IN 1849.

A report of certain of these examinations forms a part of Senate Ex. Doc. No. 47, 1st session 31st Congress, and is accompanied by a map of the Sacramento valley, from the American river to Butte creek, surveyed and drawn, by order of General Riley, commanding 10th military department, by Lieutenant Derby, Topographical Engineers, September and October, 1849, on a scale of ten miles to an inch.

SURVEY OF THE MOUTH OF RIO GRANDE, BY LIEUTENANT J. D. WEBSTER, TOPOGRAPHICAL ENGINEERS, 1847.

The report of this forms Senate Ex. Doc. No. 65, 1st session 31st Congress. The map is on a scale of an inch to a mile, and exhibits the windings of the river from Matamoras to its mouth.

SURVEY OF A ROAD FROM FORT SMITH TO SANTA FE, BY LIEUTENANT J. H. SIMPSON, TOPOGRAPHICAL ENGINEERS, 1849.

The report of this survey forms Senate Ex. Doc. No. 12, 1st session 31st Congress, and is accompanied by a map of the route, in four sheets, on a scale of one inch to ten miles. The survey was made with chain and compass, checked by astronomical observations made with a sextant and chronometer.

Lieutenant Simpson left Fort Smith about the middle of April. The party travelled by what is called the upper wagon road, along the head of Sans Bois creek. Thence, crossing the heads of Gaines' and Coal creeks, (the two branches of the south fork of Canadian,) they struck the main Canadian river at Shawneetown, opposite Edwards' old trading-house. Thence, keeping along and over the bluffs bordering the south side of the Canadian as far as Rocky Dell creek, they gradually diverged southwest from the river to the Tucumcari Hills. Continuing west, they crossed the Gallinas some ten miles above its mouth, struck the Pecos at Anton Chico, travelled the usual road to Galisteo, by the way of Cañon Blanco and the Lagunas, and thence north to Santa Fé.

RECONNAISSANCE IN THE NAVAJO COUNTRY, BY LIEUT. J. H. SIMPSON, TOPOGRAPHICAL ENGINEERS, 1849.

Lieutenant Simpson's report of this expedition forms part of Senate Ex. Doc., No. 64, 1st session 31st Congress, and is accompanied by a map of the route pursued, on a scale of an inch to ten miles.

This expedition, the object of which was the chastisement of the Navajo Indians, was under the command of Brevet Lieutenant Colonel J. M. Washington. Lieutenant Simpson was assisted in his duties by Messrs. E. M. Kern and R. H. Kern, and was provided with a sextant and chronometer for astronomical observations. The whole command left Santa Fé on the 16th August, 1849, and crossed the Rio Grande at the pueblo of San Domingo. From San Domingo they travelled a little north of west to the pueblo of Jemez, on the river of the same name. Remaining here a few days to perfect their arrangements, the line of march next lay up the Cañon de Peñasco. Travelling on the Navajo trail, they crossed the Rio Puerco and Cañada de Piedra de Lumbre. Leaving the last tributary of the Gulf of Mexico at the head of the Cañon de Torrejon, they reached the waters flowing to the Gulf of California, by cross-

ing a plateau at the head of the Rio de Chaco. This valley they followed down to the ruins of the pueblo Weje-gi. From here they travelled, somewhat north of west, to the heads of the Tune-cha creek. Crossing the Sierra de Tune-cha through Pass Washington, they came upon the Rio Negro, which flows into the Cañon de Chelly. Thence turning northward, they passed around the eastern end of the Cañon de Chelly, and, making a considerable detour to the north, struck the Rio de Chelly just below the mouth of the cañon.

Here they turned southeast and travelled along the southern border of the Cañon de Chelly. Striking a little east of south over the Sierra de Laguna, they next descended into the Cañon Bonito, which they followed some thirty miles. Crossing the head of the "Rio Puerco of the west," they then struck the Rio de Zuñi, at the Indian pueblo of that name. Here, turning eastward and following the Rio de Zuñi to the Ojo Pescado, they crossed the Sierra de Zuñi (or Madre) by the Zuñi Pass, descended the Cañon del Gallo to the spring of the same name, and travelled down the Rio Rito or San José, passing, a few miles south of Covero, to the pueblo de Laguna. Thence they continued down the same valley for about fifteen miles, when they struck northeast, and, crossing the Rio Puerco about twelve miles above the mouth of the San José, reached the Rio Grande at Albuquerque, where the expedition was disbanded, on the 22d September, 1849. Lieutenant Simpson proceeded to Santa Fé, where his report and map were prepared.

EXPEDITION OF CAPTAIN R. B. MARCY, FIFTH INFANTRY, 1849.

The report of Captain Marcy forms Senate Ex. Doc., No. 12, 1st session 31st Congress, and is accompanied by a map, drawn on a scale of an inch to thirty-six miles, embracing the country from the Arkansas river, south, to the 31st parallel, between the 94th and 108th meridians. Captain Marcy went from Fort Smith to Santa Fé, over the route surveyed by Lieutenant Simpson, Topographical Engineers. Of the remainder of his journey he prepared a map from notes taken by his command. He was not supplied with instruments for astronomical observations; his distances were measured with an odometer.

From Santa Fé he travelled south along the valley of the Rio Grande, and over the Jornado del Muerto to Doña Ana. Turning east, he struck Lieutenant Bryan's trail just before he entered the Hueco mountains, and followed it to the Pecos, passing through the Guadalupe Pass. Proceeding down the Pecos river to the Emigrant Crossing, he struck, northeast, over an unexplored country to Preston, on Red river. His route passed through the White Sand hills, near the Big Springs of the Colorado, along the northern sources of the clear fork of the Brazos, and of the north branches of the Trinity.

On his return from the Pecos to Preston, Lieutenant Harrison separated himself a short distance from the command, and was killed by the Indians.

EXPEDITION TO GREAT SALT LAKE, BY CAPTAIN H. STANSBURY, TOPOGRAPHICAL ENGINEERS, 1849-'50.

The report of this expedition forms Senate Ex. Doc., No. 3, special session, March, 1851, and is entitled "*Exploration and Survey of the Valley of the Great Salt Lake of Utah, including a reconnaissance of a New Route through the Rocky Mountains. By Howard Stansbury, Captain Corps Topographical Engineers, United States army. Philadelphia: Lippincott, Grambo & Co.*—1852." It is accompanied by a map of the routes from the Missouri river to the Great Salt lake, on a scale of 1 to 1,000,000, (about an inch to sixteen miles,) and by another of the Great Salt lake and vicinity, on a scale of 1 to 240,000, (about four miles to an inch.)

Captain Stansbury was assisted throughout by Lieutenant J. W. Gunnison, Topographical Engineers, and, during a portion of the time, by Lieutenant G. W. Howland, United States rifles. He was supplied with chronometers, sextants, barometers, odometers, theodolites, chains, &c. His last barometer was broken on the outward journey, a short distance west of Fort Laramie. The expedition consisted of eighteen men, five wagons, and forty-six horses and mules.

The party started on the 31st of May, 1849, and travelled in a northwest direction over the usual emigrant road from Fort Leavenworth to the Platte river, near Fort Kearny, thence up the valley of that river and of the South Fork to the crossing which leads to the North Fork at Ash-Hollow. Thence they followed the right bank of the North Fork to Fort Laramie. Leaving this place, the train took the usual road along the foot slopes of the Black Hills, but frequent examinations were made of the river. At Deer creek they crossed (by a ferry) the north fork of the Platte, and thence on the usual emigrant road reached the Sweetwater river, which they traced to its source in the South Pass. Thence they followed the Big Sandy to its mouth, crossed Green river, and proceeded to Bridger's Fort.

At this point, being desirous of discovering a trail to the northern end of the Great Salt lake more direct than the emigrant road, Captain Stansbury despatched his train, under Lieutenant Gunnison, by the Mormon road to Salt Lake city, and on the 20th of August, accompanied by "Major James Bridger," left the fort. Following the Mormon road to the crossing of Bear river, and then this stream for six miles to the Medicine Buttes, he struck northwest across the mountains, and came upon the head of Pumbar's creek, a tributary of Weber's river. He attempted to follow it, but was prevented by cañons and precipices. Turning now to the northwest, up a branch of the Red Chimney Fork, he reached its head by a good road, and thence descended Ogden's river by a difficult path, which, after a mile, led him to so narrow and rugged a part of the valley that he was forced to leave it. Diverging to the north through Ogden's Hole, he crossed the range of mountains which divide Ogden's Hole (or valley) from Great Salt lake, and, taking the wagon road, reached Salt Lake city about the 28th of August. His wagon train had arrived on the 23d.

On the 12th September Captain Stansbury left Salt Lake city, and took the road through the valley of Roseaux creek and Pannack river to Fort Hall. Returning by the same route to Bear river, he passed up through the gorge which this river makes in coming from the mountains, and explored Câche valley.

On the 19th October he left Bear river with five men and sixteen pack mules, to make an exploration of the western shores of the Great lake. He travelled west to a mountain ridge forming a rocky promontory jutting into the lake, that caused him to turn south. Rounding the point, he travelled north along the western base of the same ridge, then west and south over an artemisia and sand plain, and finally struck for Pilot Peak. From this he turned southeast over the salt desert, and returned to Great Salt Lake city. This journey, which Bonneville's trappers failed to perform, was not effected by Captain Stansbury without great suffering and hardships.

Lieutenant Gunnison had meanwhile been engaged in surveying the Great Salt lake and Utah valley. His operations were, however, stopped by the cold weather in the latter part of November.

The survey was resumed as early as possible in the next year, and continued until August 12, 1850.

On the 28th of August they left Salt Lake city with a train of pack mules. Passing through the Wasatch mountains by the "Golden Pass" formed by Cañon creek, they followed this creek to its head and struck Bauchman's creek, a branch of East Cañon creek, a tributary of Weber's river. Fording Bauchman's creek, they continued east over the prairie of Parley's Park to the sources of Silver creek, which flows into Weber's river. Sending the train on the Mormon road to the ford of Weber river, Captain Stansbury travelled southerly into the Kamas prairie, exploring the heads of Weber and Timpanogos rivers, which lie on opposite borders of this plain. Returning thence, he followed the right bank of Weber's river for 17 miles, and rejoined his train at the ford.

Crossing Red Fork, the party now travelled northeasterly up the valley of that stream to its head; thence they descended Yellow creek, a tributary of Bear river, and passing close around the base of the hills called the Needles, crossed Bear river about five miles south of Medicine Butte, near Tar Springs. By an open, easy road they passed the summit of the divide between the waters of the Great Salt lake and those of Green river, at the point where Muddy Fork takes its source, and reached Bridger's Fort.

Desiring to explore a direct route on their homeward journey, they left Bridger's Fort under the guidance of James Bridger, crossed Green river at the mouth of Bitter creek, and ascended the latter to its source. From this point they passed the sources of Snake river and crossed the divide between the waters of the Gulf of California and the Atlantic, at Bridger's Pass. Fording the north fork of the Platte at a favorable point, they passed to the north of the Medicine Bow Butte, and thence took a direction southwest, which led them by the sources of Medicine Bow and Laramie rivers to the Black Hills, whence they reached the head of Crow creek, a tributary of the south fork of the Platte. They followed Crow creek for 14 or 15 miles, when, finding that it turned too much to the south to afford a direct easterly route, (as Lieut. W. B. Franklin's reconnaissance in 1845 had indicated,) they left the stream and travelled north along the spurs which project from the eastern face of the Black Hills. Crossing the heads of Lodge Pole creek, they encamped in the Shyenne Pass, on the heads of the Chugwater, and sent to Fort Laramie for provisions, intending to descend Lodge Pole creek to the south fork of the Platte. But while engaged in exploring the country in this vicinity, Captain Stansbury met with a severe accident that precluded the possibility of continuing the survey, and the party proceeded down the Chugwater to Fort Laramie, and returned to Fort Leavenworth by the route they came over in 1849.

MARCH OF RIFLE REGIMENT TO OREGON, 1849.

An account of this march by Major Osborne Cross, A. Q. M., forms an appendix to the report of the Quartermaster General's report to the Secretary of War. It is printed in House Ex. Doc. No. 1, 2d session 31st Congress.

This regiment, under Colonel Loring, marched from Fort Leavenworth to the Columbia river, with wagons. It passed over the same route as Captain Stansbury did to Bear river, then turned down Bear river to Bear Spring, and crossed over to Fort Hall. The command travelled all the way down the left bank of Snake river to Fort Boisée, and thence through the Grande Ronde and over the Blue mountains to Fort Walla-Walla. It encountered great difficulties and lost many animals.

EXPEDITION TO THE RED RIVER OF THE NORTH, 1849.

The report of the commander of this expedition, Brevet Major S. Woods, 6th infantry, U. S. A., forms House Ex. Doc. No. 51, 1st session 31st Congress. That of Captain John Pope, Topographical Engineers, who was attached to the command, is to be found in Senate Ex. Doc. No. 42, 1st session 31st Congress, and is accompanied by a map of the route, on a scale of an inch to 20 miles, based on the map of the Hydrographical Basin of the Upper Mississippi, by Mr. Nicollet, most of which latter map is here repeated. On the outward journey, Captain Pope measured the road with an odometer, took courses with a compass, and made observations for latitude with a sextant.

The expedition started from Fort Snelling, crossed the Mississippi, advanced up the left bank to Sauk rapids, recrossed the Mississippi, and proceeded along the Red river trail in a northwest direction, passing near White Bear lake, and crossing Red river above its junction with the Bois de Sioux river, and again at Graham's Point. Diverging gradually from the Red river towards the sources of its tributaries flowing from the plateau of Miniwakan lake, they finally reached Pembina. The command returned to Fort Snelling over the same route. Captain Pope ascended the Red river in a canoe to Otter Tail lake; thence he made a portage to Crow Wing river, and paddled down that stream to Fort Ripley. From this place he returned to Fort Snelling.

RECONNAISSANCES IN TEXAS, BY BREVET LIEUTENANT COLONEL J. E. JOHNSTON, LIEUTENANTS M. L. SMITH, WM. F. SMITH, F. T. BRYAN, AND N. MICHLER, TOPOGRAPHICAL ENGINEERS, AND LIEUTENANT H. C. WHITING, ENGINEERS, IN THE YEARS 1849-'50, AND '51.

No reports have as yet been published giving the whole extent of the explorations made in Texas by the above mentioned officers. The following notice of such data as have come to my knowledge will therefore be the more acceptable. The reports of explorations that have been published form part of the Senate Ex. Doc. No. 64, 1st session 31st Congress. The report of Captain S. G. French, A. Q. M., of the southern route from San Antonio to El Paso, forms also a part of this document, which is accompanied by a map of the routes described, on a scale of an inch to twenty miles.

Lieutenant Wm. F. Smith, in February, 1849, started to explore a road from San Antonio to El Paso. He travelled northwest to the San Saba river, via Fredericksburg, then westward to its source, from which he passed over to the Pecos at Live Oak creek. He then proceeded to the Limpia river, and made his way to the Rio Grande by the road which strikes it about latitude 30° 38′, thence he travelled to El Paso. He returned over nearly the same route to the Pecos, but continued down that river to about twenty-five miles below Live Oak creek; thence he passed east to the San Pedro river, travelled south to near its mouth, where he crossed it, and struck east to San Antonio. Lieutenant W. H. C. Whiting was with Lieutenant Smith on this reconnaissance.

Lieutenant F. T. Bryan left San Antonia, June 14, 1849, for El Paso, and taking nearly the same route, as Lieutenant Smith, to the San Saba river, crossed it, and travelled north to the north branch of Brady's river, where he struck west along the head of the Rio Concho, and thence to the Pecos at the Horse-head crossing. Fording the river he travelled up its right bank to Salinas creek; thence he struck northwestward to Delaware creek, ascended it to its source, and crossed the Guadalupe mountains, through the Guadalupe Pass; thence he proceeded to the Sierra de los Alamos, and thence through the Sierra Hueco to El Paso.

Colonel Johnston, in 1849, directed the construction of a road for the troops over the route discovered by Lieutenant Wm. F. Smith. From Leon spring he attempted, but without success, to find a more direct wagon route west, going north of the Limpia.

On arriving at El Paso, Colonel Johnston and Lieutenant Bryan surveyed the valley of the Rio Grande to Doña Ana, while Lieutenant Wm. F. Smith examined the Organ mountains north to Salina de San Andres, and the Sacramento mountains, between the cañon del Perro and La Cienega.

Colonel Johnston and party returned to the Pecos by the route that Lieutenant Bryan had explored through the Guadalupe Pass; thence they passed down the Pecos river to the mouth of Live Oak creek, from which point they examined the direct route to Fort Inge, across the heads of the San Pedro and Nueces rivers. During Colonel Johnston's reconnaissance the roads were measured with an odometer, and numerous observations were made with the sextant.

Lieutenant N. Michler, in 1849, made a reconnaissance of the country from Corpus Christi to Fort Inge, along the valleys of the Nueces, Leona, and Frio rivers, for the purpose of opening a military road.

Lieutenant Michler then examined the route from San Antonio to Fort Washita, passing through Austin, Navarro, Dallas, and Preston, and thence to the emigrant crossing of the Pecos. The return route from Fort Washita lay up the Red river to the mouth of the Little Witchita, thence west to the Big Witchita, thence southwest to the Double Mountain Fork, thence to the Big Springs of the Colorado, and thence through the White Sand hills to the Pecos. From this point he returned to San Antonio over nearly the route previously explored by Lieutenant Bryan as far as the head of the Concho, where he struck southwest to the San Saba, and thence, by Forts Mason and Martin Scott, to San Antonio. The distances along the route from Fort Washita to the Pecos were chained. No mention is made of astronomical observations being taken on this journey.

Captain R. B. Marcy, fifth infantry, had just passed over the portion of the route from the Pecos to the Double Mountain Fork, and gave Lieutenant Michler information concerning it. They both considered the Double Mountain Fork to be tributary to the main Brazos; but Captain Marcy's examinations in 1854 make it appear to be a branch of the Clear Fork of the Brazos.

An examination was also made of the Colorado, with the view of improving its navigation, by Lieutenant Wm. F. Smith, assisted by Messrs. R. A. Howard and J. F. Minter.

Lieutenant Whiting reconnoitred the route between San Antonio and Preston, *via* Fredericksburg, Fort Croghan, Fort Gates, Fort Graham, and Fort Worth. This route was also examined by Lieutenant Bryan, Topographical Engineers.

The above items are mainly from the printed reports or maps. The following information in regard to the unpublished maps of the explorations in Texas, in 1850–'51, have been obtained from the officers engaged in the surveys. In the Topographical Bureau there are two maps, both incomplete, of these explorations; and each contains routes not upon the other.

In January, 1849, Lieutenants Bryan and Michler, Topographical Engineers, examined Aranzas and Corpus Christi bays, and the road from Corpus Christi to San Antonia, *via* San Patricio and Calaveras. In February, 1849, they made a reconnaissance of the lower road from San Antonio to the crossing near Presidio de Rio Grande, *via* Fort Inge; and also of a road from the San Fernando Crossing to San Antonio.

In May, 1849, Lieutenant Michler examined the road from San Antonio to Port Lavacca; and in June and July, 1849, the road between Corpus Christi and Fort Inge, along the Nueces, Frio, and Leona rivers.

In May, 1850, Lieutenants Wm. F. Smith and F. T. Bryan, Topographical Engineers, surveyed the Rio Grande with boats from El Paso to Presidio del Norte, where they met Lieutenant Colonel Johnston, Topographical Engineers, who, assisted by Messrs. Howard and Minter, had reconnoitred the country between the first ford of Devil's river and Presidio del Norte. Colonel Johnston and his assistants failed in their attempt to transport the boat to a point below the falls of the Rio Grande. The reconnaissance was, however, continued along the river, touching it at different points as far as the Pecos. A map of these reconnaissances, on a scale of ten miles to an inch, is in the Topographical Bureau.

From August to November, 1850, Lieutenants M. L. Smith and N. Michler examined a road from San Antonio to Ringgold barracks, *via* Fort Merrill, of which we have no map. They also surveyed the Rio Grande from Ringgold barracks to a point eighty miles above the mouth of the Pecos.

In April, 1851, Lieutenant Bryan laid out and made a road from Austin to Fort Mason, of which we have no map.

In April, 1851, Colonel Johnston reconnoitred the western frontier of Texas from the headwaters of the Nueces to Fort Belknap, *via* the headwaters of the Llano, San Saba, Concho, and Clear Fork of Brazos. Lieutenant Bryan accompanied General Smith, in 1851, on his tour to establish posts along the western frontier of Texas; and he made numerous reconnaissances between San Antonio and Fort Belknap, and between the latter and Fort Graham.

There were other surveys and reconnaissances made by these officers; but the maps are not available, and I have experienced more difficulty in compiling the map of Texas than that of any other portion. Throughout most of the above examinations astronomical observations were made for latitude. The longitude of San Antonio was determined by Colonel Johnston by moon culminations.

In April, 1851, Lieutenants W. F. Smith and N. Michler were placed on duty on the United States Mexican Boundary Survey. Lieutenant Bryan left Texas in the spring of 1852; Lieutenant M. L. Smith in November, 1852; Colonel Johnston in the spring of 1853.

MAP OF THE TERRITORY OF THE UNITED STATES WEST OF THE MISSISSIPPI RIVER, ETC., 1850.

To this Map the following title was affixed: "A map of the United States and their Territories, from the Mississippi river to the Pacific Ocean, and of part of Mexico; compiled in the Bureau of the Corps of Topographical Engineers, under a resolution of the United States Senate, from the best authorities which could be obtained."

This map was published on a scale of 50 miles to an inch, and contained material from the greater portion of the maps I have already described.

RECONNAISSANCE ON THE PECOS, BY MR. R. H. KERN, 1850.

A military reconnaissance of the Rio Pecos, as far south as the Bosque Grande, was made, in 1850, by Mr. R. H. Kern, who was attached to the command of Captain H. B. Judd, 3d artillery. It was probably made with a compass and estimated distances, and without any astronomical observations; but of this I have no positive information. The map of the reconnaissance was used by Lieut. Parke in his compiled map of New Mexico in 1851.

MAP OF NEW MEXICO, COMPILED BY LIEUT. J. G. PARKE, TOPOGRAPHICAL ENGINEERS, IN 1851.

This map, by Lieut. Parke, was a careful compilation of all the available and reliable information in relation to New Mexico which could be obtained at that date from trappers and hunters, as well as from actual survey. It was prepared by him, while in that country, by order of Brevet Colonel Jno. Munroe, United States army, commanding 9th military department, and was drawn by R. H. Kern in 1851. It was subsequently reduced in the Bureau of Topographical Engineers, and published on a scale of thirty-six miles to an inch.

RECONNAISSANCE FROM SANTA FE TO FORT LEAVENWORTH, IN 1851, BY CAPTAIN J. POPE, TOPOGRAPHICAL ENGINEERS.

Captain Pope travelled on the Cimarron route as far as Cedar creek, where he turned north and struck the Arkansas at the Big Timbers. Crossing this river he took a northeast course to the Smoky Hill Fork, and came upon it near where Captain Frémont struck it in 1844. From this point he travelled down the stream.

The map constructed by Captain Pope would make it appear that what had been considered the source of Smoky Hill Fork, taking its rise near the sources of Bijou and Boiling Spring creeks, was probably that of the Big Sandy or some other tributary of the Arkansas.

SURVEY OF CREEK BOUNDARY, BY CAPTAIN SITGREAVES AND LIEUT. WOODRUFF, TOPOGRAPHICAL ENGINEERS, 1850–'51.

The report and map of this survey form printed House Ex. Doc. No. 104, 1st session 35th Congress. The map is on a scale of 1 to 600,000, or about an inch to nine and a half miles. Chain and compass were used in the survey, and the longitude of Fort Gibson was determined by moon culminations. A sextant was used to determine the latitudes.

The northern line begins on the parallel which passes near the mouth of the Red fork of the Arkansas, at a point a little west of north from Fort Gibson, and continues west on the parallel to the 100th meridian. Of this line about seventy-nine miles were surveyed in 1849 by Captain L. Sitgreaves, Topographical Engineers, and one hundred and twenty miles by Lieut. I. C. Woodruff, Top. Engineers, in 1850, who also surveyed the north fork of the Canadian from this boundary line to its mouth. The boundary was not determined west of the 99th meridian.

RECONNAISSANCE DOWN THE ZUÑI AND COLORADO RIVERS, BY CAPTAIN L. SITGREAVES, UNITED STATES TOPOGRAPHICAL ENGINEERS, IN 1851.

The report of this forms Senate Ex. Doc. No. 59, 2d session of 32d Congress, and is accompanied by a map of the routes pursued, on a scale of ten miles to an inch. The reconnaissance was made with a compass and estimated distances, and checked by astronomical observation made with a sextant.

This expedition, under Captain Sitgreaves, assisted by Lieut. J. G. Parke, Topographical Engineers, Mr. R. H. Kern as topographer, and Dr. S. W. Woodhouse, surgeon and naturalist, was organized at Santa Fé, New Mexico, and consisted of about twenty persons, including packers and servants; pack mules being used for transportation of provisions, &c. The party accompanied an expedition against the Navajoes as far as Zuñi, which point they reached by the usual road from Albuquerque on the 1st of September, 1852. From this point, with an escort of thirty men of the 2d artillery, the exploring party travelled down the Zuñi river to

within ten miles of its mouth, when they left the river, and, crossing a basaltic ridge, struck the Colorado Chiquito, down which they travelled until they were opposite the northern end of the San Francisco mountains. Here they left the river and travelled southwest, around the base of the mountains, to Leroux Spring. Leaving this they passed around the southern base of Bill Williams' mountain, and thence pursued a course a little north of west, over a broken, basaltic, and barren country, to the head of Yampai creek. From this point they travelled westward to the Great Colorado, at the head of the Mohave valley; thence down the valley of the Colorado to Fort Yuma, and thence by the usual emigrant road over the Colorado desert, by Warner's Pass, to San Diego, California, where the party was disbanded.

RECONNAISSANCE OF THE COLORADO RIVER, BY LIEUTENANT DERBY, TOPOGRAPHICAL ENGINEERS, 1851.

The report of this forms Senate Ex. Doc. No. 81, 1st session 31st Congress, and is accompanied by a map, on a scale of 4 miles to an inch, of the Colorado river from its mouth to Fort Yuma. Lieutenant Derby was supplied with a sextant and chronometer.

On the 1st of November, 1851, he sailed from San Francisco on board of a schooner carrying provision for the garrison at Fort Yuma. Doubling the southern extremity of Lower California, he passed up the gulf to the mouth of the Colorado, and thence (the vessel drawing 8 feet) to Howard's Point. Above this he ascended, in a small boat, to Heintzleman's Point, about one-third of the distance from the gulf to Fort Yuma, where he met Major Heintzleman. This officer furnished him with a sketch of the river between Fort Yuma and the place of meeting, and from this point he returned to San Francisco.

RECONNAISSANCE OF LIEUTENANT WOODRUFF, TOPOGRAPHICAL ENGINEERS, 1852.

Lieutenant I. C. Woodruff, Topographical Engineers, made a reconnaissance, in 1852, of a portion of the Kansas river; of Walnut creek; of Pawnee Fork; and of other streams lying between the Smoky Hill Fork of the Kansas and the Arkansas rivers. These examinations were made for the purpose of selecting proper sites for military posts. The map and report prepared by Lieutenant Woodruff have never been published. The former was made from compass notes and estimated distances, checked by the astronomical determinations of Captain Frémont and Major Emory.

EXPEDITION TO THE SOURCES OF RED RIVER, BY CAPTAIN R. B. MARCY, UNITED STATES INFANTRY, 1852.

The report of this expedition forms Senate Ex. Doc. No. 54, 2d session 32d Congress, Ho. Ex. Doc. 1st session 33d Congress, and is accompanied by numerous illustrations and by two maps, one of which exhibits the country from the 91st to the 114th meridian, lying between the 31st and 38th parallels, drawn on a scale of 24 miles to an inch; the other, on a scale of 10 miles to an inch, shows the country surrounding the sources of Red river.

Captain Marcy was assisted by Brevet Captain G. B. McClellan, Engineers, who made astronomical observations for latitude and longitude by means of a sextant and "pocket lever watch." The routes were mostly measured with an odometer, and observations were taken with a barometer. Dr. G. G. Shumard accompanied the expedition as surgeon and geologist.

Starting on the 2d of May with his company, Captain Marcy marched to Red river, at the mouth of the Little Witchita, and up the right bank of the latter stream to the mouth of the Big Witchita, where they crossed Red river. Proceeding westward, between Red river and a branch of Cache creek, they struck the north Fork of Red river at the west end of the Witchita mountains, and followed that stream to its source in the Llano Estacado. Here an excursion

was made to the valley of the Canadian river at Sand creek, in order to test and check the position of the party by the surveys that had been made along that stream. They now travelled south to the Kech-ah-que-ho-no, or main Red river, and, leaving their train at the place where the river comes out from the bluff of the Llano Estacado, ascended it to the spring which forms its source. From this they returned down the left bank of the river to the Witchita mountains, which were examined, and thence they proceeded to Fort Arbuckle, where the expedition terminated.

CHAPTER IV.

EXPLORATIONS FROM A. D. 1852 TO A. D. 1857.

GOVERNOR I. I. STEVENS AND CAPTAIN G. B. McCLELLAN, U. S. ENG., EXP. AND SUR. R. R. ROUTE, 1853–'54–'55.—LIEUTENANT R. ARNOLD, U. S. A., SURVEY, 1854.—F. W. LANDER, C. E. RECONNAISSANCE, 1854.—CAPTAIN G. W. GUNNISON, T. E., AND CAPTAIN E. G. BECKWITH, U. S. A., EXP AND SUR. R. R. ROUTE, 1853.—CAPTAIN E. G. BECKWITH, U. S. A., EXP. AND SUR. R. R. ROUTE, 1854.—CAPTAIN A. W. WHIPPLE, T. E., EXP. AND SUR R. R. ROUTE, 1853–'54.—LIEUTENANT R. S. WILLIAMSON, T. E., SURVEY FOR RAILROAD ROUTE, 1853–'54.—LIEUTENANT J. G. PARKE, T. E., EXP. AND SUR. R. R. ROUTE, 1854.—CAPTAIN J. POPE, T. E., EXP. AND SUR. R. R. ROUTE, 1854.—LIEUTENANT J. G. PARKE, T. E., EXP. AND SUR. R. R. ROUTE, 1854–'55.—LIEUTENANT R. S. WILLIAMSON, T. E., AND LIEUTENANT H. L. ABBOTT, T. E., EXP. AND SUR. R. R. ROUTE, 1855.—MAJOR W. H. EMORY, U. S. A., UNITED STATES AND MEXICAN BOUNDARY SURVEY, 1849 TO 1855.—CAPTAIN J. L. RENO, U. S. A., SURVEY, 1853.—CAPTAIN R. B. MARCY, U. S. A., EXPLORATION, 1854.—ALEXANDER ROSS, FUR HUNTERS OF THE FAR WEST, 1855.—MARCH OF COLONEL STEPTOE'S COMMAND TO CALIFORNIA, 1854–'55.—LIEUTENANT J. WITHERS, U. S. A., SURVEY OF ROAD, 1854.—LIEUTENANT G. H. DERBY, T. E., SURVEY ROADS, 1854–'55.—LIEUTENANT G. H. MENDEL, T. E., RECONNAISSANCE, 1855.—CAPTAIN J. H. SIMPSON, T. E., SURVEY ROADS, 1855.—LIEUTENANT G. K. WARREN, T. E., RECONNAISSANCE, 1855.—LIEUTENANT F. T. BRYAN, T. E., RECONNAISSANCE, 1855.—LIEUTENANT J. C. AMORY, U. S. A., RECONNOISSANCE IN 1855.—MAJOR MERRILL, U. S. A., RECONNAISSANCE, 1855.—LIEUTENANT I. N. MOORE, U. S. A., MAP PART OF NEW MEXICO, 1855.—LIEUTENANT E. L. HARTZ, U. S. A., RECONNAISSANCE, 1856.—LIEUTENANT F. T. BRYAN, T. E., SURVEY OF ROAD, 1856.—CAPTAIN J. H. DICKERSON, U. S. A., SURVEY ROAD, 1856.—LIEUTENANT W. D. SMITH, U. S. A., ROUTE, 1856.—CAPTAIN A. SULLY, U. S. A., RECONNAISSANCE, 1856.—LIEUTENANT G. K. WARREN, T. E., RECONNAISSANCE MISSOURI AND YELLOWSTONE, 1856.—EXPLORATIONS ORDERED IN 1857.

EXPLORATION AND SURVEY FOR A RAILROAD ROUTE NEAR THE FORTY-SEVENTH AND FORTY-NINTH PARALLELS, 1853–'54–'55.

THE reports of this exploration and survey will be found in Volume I,* Senate Ex. Doc. No. 78, 2d session 33d Congress; and House Ex. Doc. No. 91, 2d session 33d Congress.—Quarto edition.

They are accompanied by a map, in three sheets, drawn on a scale of 1 to 1,200,000, exhibiting the entire exploration; and a sheet of profile on a horizontal scale of 1 to 3,000,000, the vertical scale being 1 to 60,000, or fifty times greater.

A brief report of the progress of the survey was published in Senate Ex. Doc. No. 29, 1st session 33d Congress, which is accompanied by a map of the route from St. Paul to Fort Union, drawn on a scale of 1 to 1,200,00.

A nearly complete report is contained in House Doc. No. 129, 1st session 33d Congress, accompanied by a profile and map, in three sheets, showing the entire route, drawn on a scale of 1 to 1,200,000. This map is, however, not so complete as the one in the quarto edition.

An additional report has also been made by Governor Stevens, which will appear in a subsequent volume with numerous landscape illustrations†.

This expedition, as first organized, consisted of four separate parties. The one under Governor Stevens' personal supervision, operated from St. Paul westward towards the mouth of White Earth river; thence on the prairies lying along the Missouri river to the Rocky mountains; and then among the passes of that region. Another, under Brevet Captain G. B.

* Vol. I also contains the report of the Secretary of War and Captain A. A. Humphreys on the comparative advantages of the routes examined. These are accompanied by a map of the Territory of the United States, from the Mississippi to the Pacific, on a scale of 1 to 3,000,000, and a sheet of profiles of all the routes on a horizontal scale of 1 to 3,000,000, and a vertical scale of 1 to 60,000.

† Ordered by the Senate at the 2d session 35th Congress.

McClellan, Engineers, began at Fort Vancouver, on the Columbia, operated northeastward, examining the passes of the Cascade range ; and then eastward to join Governor Stevens' party. Another party, under Lieutenant A. J. Donelson, Engineers, examined the Missouri river from its mouth to the Yellowstone, where a junction was made with that under Governor Stevens. The fourth party, under Lieutenant R. Saxton, U. S. Art., conducted a reconnaissance from Fort Walla-Walla to the Bitter Root valley, where a depot was established.

The party under the immediate supervision of Governor Stevens took the field at St. Paul's on the 8th June. The principal engineer and scientific assistants consisted of Lieutenant C. Grover, U. S. Art.; Dr. George Suckley, surgeon and naturalist; Messrs. F. W. Lander and A. W. Tinkham, civil engineers; Mr. J. Lambert, topographer; Mr. J. M. Stanley, artist; Mr. G. W. Stevens, assistant astronomer; and Mr. J. Moffett and Mr. J. Doty, meteorologists. Governor Stevens failed in securing the services of the officer designed to take charge of the astronomical observations.

The party was well supplied with suitable instruments. Odometers, compasses, barometers, thermometers, sextants, chronometers, and a portable astronomical transit of twenty-six inches focal length, (which latter was not used.)

Governor Stevens and party left St. Paul June 8, and crossed the Mississippi at Sauk Rapids. Several other crossings were examined for railroad bridges.

They then took the Red river trail, and, on arriving at Pike lake, Lieutenant Grover was detached to make a side reconnaissance.

The main party proceeded to make an examination of the railroad line to Fort Union, crossing the Shayenne river twice and passing some twenty-five miles south of Miniwakan lake. Mr. Lander also made a reconnaissance of the valley of the Shayenne river between the two crossings; also of a portion of the Côteau du Missouri, some twenty miles westward of the general route, and of the upper valley of Mouse river.

Lieutenant Grover, on being detached, examined a route from Pike lake towards Moose Island lakes; thence deflected to the south, and followed up the eastern bank of Lake Travers and Bois de Sioux river; thence by the Dead Colt Hillock and Butte des Os, and through the valley of Mouse river to Fort Union. His trail joined that pursued by the main party on Mouse River valley. During the reconnoissance he was supplied with odometer, compass, and meteorological instruments.

Lieutenant Donelson and party—consisting of Lieutenant John Mullan, 1st artillery, Mr. Wm. Graham, and six enlisted men—left St. Louis in a steamboat on the 21st of May, and arrived at Fort Union, on the Missouri river, July 3. On the passage a reconnaissance of the river was made. Astronomical observations with a sextant, and meteorological observations with a barometer, being taken. Collections in natural history were also made. The topographical sketches of this examination were mostly lost afterwards on the Isthmus of Panama, and the map was made from incomplete notes.

While waiting the arrival of Governor Stevens, Lieutenant Donelson reconnoitred the country in the vicinity of Fort Union, travelling northwest to a point about opposite the head of the Big Muddy, then nearly northeast to the Grand Côteau, at a point near the head of the White Earth, then nearly southwest to that stream, then down it a few miles, and thence back to Fort Union. This examination was made without a barometer, and distances were estimated.

On the 9th of August the expedition moved from Fort Union in two parties. One under the command of Lieutenant Donelson, intending to examine the route near the forty-ninth parallel, and the other to take the route of Milk river travelled by the American Fur Company's wagons.

Both parties, however, united at Big Muddy river, and the route proposed for Lieutenant Donelson was abandoned. The entire party then took the road to Fort Benton, which, leaving the Missouri at the mouth of Milk river, follows this stream to the western end of the Bear's Paw mountains, and there crosses over the prairie to the Missouri at Fort Benton.

On the 3d of September, Mr. Tinkham, with a few men, left the main party at Bear's Paw mountains, and examined the valley of Milk river nearly to the 49th parallel. Thence he proceeded to the Three Buttes, (there are also three peaks of this name lying on the source of Lewis' river.) He then pursued a southwest course to Maria's river, and crossing this stream took a southeast direction to Fort Benton.

On the 11th of September, Mr. J. M. Stanley left the Maria's river, near Fort Benton, and proceeded to the Cypress mountains, in the British Possessions, from which place he returned to Fort Benton, passing near the Three Buttes and Lake Pakokee.

On the 9th of September, 1853, Lieutenant Mullan, with a small party. left Fort Benton to visit the Flat Head camp reported to be "beyond the Muscle Shell," designing to conduct a delegation to the council to be held at St. Mary's village. A barometrical profile of the route was to be taken by Mr. Burr, but on the 10th the barometer became unfit for service.

Crossing the Missouri, Lieutenant Mullan travelled in a southeast direction, passing along the sources of Judith river, until he reached what he calls the Muscle Shell river. This stream was probably the Yellowstone river, as will be seen by comparing his map and description with those of Captain Clarke in Lewis and Clarke's Expedition.* Lieutenant Mullan afterwards agreed with my opinion when I called his attention to the matter.

* Governor Stevens, in his reports, always speaks of this stream as the Muscle Shell river. As I felt compelled to differ from him in compiling the general map, I submit herewith the evidence in favor of my opinion.

1. Two points of the routes of the reconnaissances made under Governor Stevens, viz: the mouth of the Yellowstone and the Hot Springs, near the source of the Missouri river, are also on the trail of the reconnaissance of Captain Clarke. Having laid down the Yellowstone river from Captain Clarke's map, assuming Governor Stevens' position for these two common points as correct, I found the Yellowstone to occupy nearly the position where Lieutenant Mullan places the Muscle Shell.

2. Lieutenant Mullan travelled eighty miles south of the so-called Muscle Shell, without reaching the Yellowstone, which would require an error of not less than eighty miles in Captain Clarke's map at this point—a thing very improbable, especially as from the survey which I made of the Yellowstone from its mouth to Powder river, it was found that the position of the latter point was nearly correct, as laid down from Captain Clarke's map, in the manner stated.

3. The description of this portion of the Yellowstone by Capt. Clarke corresponds well with that of the Muscle Shell given by Lieutenant Mullan. Captain Clarke says, in his Journal of July 16, 1806: "Although just leaving a high snowy mountain, the Yellowstone is a bold, rapid, and deep stream, *one hundred and twenty yards in width.*" Lieutenant Mullan says, in his journal of September 13, 1853, in speaking of the Muscle Shell: "This river is about forty to fifty yards wide, and between two and four feet deep, with a very rapid current; the current is much more so where we struck it than the Missouri itself. *The stream, during the high water season, judging from the portion of the bed at present dry, is about one hundred and twenty yards wide.*" It was the high stage of the river when Captain Clarke passed down.

Captain Clark says: "The mountains on the east side of the river are rough and rocky, and still retain great quantities of snow; and two other high snowy mountains may be distinguished, bearing north fifteen or twenty miles, and the other nearly east. * * * At the distance of nine miles from the mountains, a river" (called on the map Shield's river,) "discharges itself in the Yellowstone from the northwest, under a high rocky cliff."

Lieutenant Mullan says, (journal of September 19,) "The country south of the Muscle Shell, extending to the base of the Snow mountains, is very rugged and broken, while that to the north, towards the Belt mountains, is partially wooded, and rises gradually from the Muscle Shell river to the base of the mountains. We passed this morning the mouth of the southwest fork coming from the Snow mountains, which was well wooded, and as large and rapid as the northwest fork, with which it made an angle of 38°."

Lieutenant Mullan's *northwest fork* I take to be Captain Clarke's *Shield's river*, and the southwest fork, the *Yellowstone*. The evidence that Lieutenant Mullan crossed the Yellowstone seems to me conclusive.

Crossing the Muscle Shell (Yellowstone) he travelled southeast for eighty miles, where he met the Flathead (Selish) Indians, and then returned to the Muscle Shell, (Yellowstone.)

Travelling up this stream to where a river comes in from the northwest, (probably Shields' river,) he ascended this stream, and crossing the Belt mountains, struck a stream (probably Smith's river of Lewis and Clarke) running into the Missouri.

Following down the valley of this river for a day, they left it, crossed another mountain range, and reached and forded the Missouri. Continuing west, Lieutenant Mullan crossed the divide between the Missouri and Columbia, through the Hell-Gate Pass, at the source of the Little Blackfoot Fork of the Hell-Gate river. Following down the latter stream he proceeded to the Bitter Root or St. Mary's river, and along it to Fort Owen or Mission of St. Mary.

Lieutenant Saxton arrived at Fort Benton on the 12th of September. He had been charged with establishing a depot of supplies at St. Mary's village, and left the Dalles on the 18th of July, 1853. His party consisted of Lieutenants Robert McFeely and Richard Arnold, Messrs. Arnold and Hoyt, and forty-nine enlisted men, packers, &c. They were provided with barometers, compasses, sextants, and chronometers. The distances were estimated. The party followed the emigrant trail near the Columbia to Walla-Walla. On the 30th July they left that place and travelled in a northeast direction, crossing Snake river at the mouth of the Pelouse in canoes.

At the Spokane river their only mercurial barometer was broken, and observations were continued with an aneroid. They travelled up the Spokane river to the Cœur d'Alene river, and up this to the Cœur d'Alene prairie, where they struck north to Clarke's Fork. Their route was then up Clarke's Fork to near the place where it is formed by the union of the Bitter Root river with the Flathead river. Here the road leaves the stream a short distance and passes over to the Flathead river. Lieutenant Saxton left this latter stream at the mouth of Jocko river, and crossed over to the Bitter Root Fork, at the mouth of Hell-Gate river, and thence proceeded along it to the Mission of St. Mary.

At St. Mary the party separated, Lieutenant Arnold being left in charge of the depot. On the 2d of September Lieutenant McFeely, with nineteen men, returned to the Dalles by the Nez Percés trail, which ascends the Bitter Root to near its head, then turns west through very difficult mountains to the sources of the Kooskoosky. Lieutenant McFeely made no map of his route.

Lieutenant Saxton proceeded by the way of Blackfoot river across the mountains, through the Blackfoot or Cadotte's Pass, to Fort Benton. Lieutenant Saxton made a sketch of his route, but it was subsequently mapped by the main party under Lieutenant Donelson. On the 22d September Lieutenant Saxton started with a party in a flat boat for St. Louis, but took no further topographical sketches.

Governor Stevens found it necessary, from the information received from Lieutenant Saxton, to abandon his wagons at Fort Benton and push rapidly forward.

Lieutenant Donelson was placed in charge of the main party; Lieutenant Grover was directed to survey the Missouri from the Great Falls to the mouth of Milk river; and Mr. Doty was left at Fort Benton to take meteorological observations. Governor Stevens himself went in advance to St. Mary's by the route over which Lieutenant Saxton had come.

Lieutenant Donelson moved from Fort Benton on the 16th September. Travelling in a southwest direction, he crossed the ridge which separates the waters of the Atlantic from those of the Pacific, through the pass Governor Stevens calls Cadotte's Pass, and proceeded down the

Black Foot Fork to St. Mary. He then passed from the Bitter Root to the Jocko, and following the latter to its mouth entered the valley of Clarke's Fork, followed it to a point twelve miles below Lake Pend d'Oreille, crossed to the Spokane river, and proceeded about twelve miles west, where he joined Captain McClellan's party. Thence following an Indian trail, and crossing the Saptin or Lewis's Fork of the Columbia, at the mouth of the Pelouse, the party arrived at Walla-Walla on the 6th of November.

On the 19th September Mr. A. W. Tinkham, leaving Lieutenant Donelson's party at Fort Benton, proceeded up the valley of the Sun river to the forks of that stream, crossed the dividing ridge, and made a reconnaissance connecting the valley of the Blackfoot and Jocko rivers.

Mr. Lander also made a reconnaissance of a route from Fort Benton westward, lying a little north of that of Lieutenant Donelson, and crossing the mountains by what Governor Stevens calls Lewis and Clarke's Pass.

Governor Stevens having concluded his Indian council at St. Mary's, directed Lieutenant Mullan to establish there a winter post; Mr. Tinkham to make an examination of the Maria's Pass; and Dr. Suckley to descend the Bitter Root, Clarke's Fork, and Columbia in a canoe. He started himself with a small party, accompanied by Mr. Stanley, and proceeded down the Bitter Root river to the St. Regis Borgia. At the source of this stream they crossed the Bitter Root mountains, passed down the Cœur d'Alene river to the Spokane, and thence to Fort Colville, where they met Captain McClellan, and proceeded with him to Fort Walla-Walla.

About twelve miles below Lake Pend d'Oreille, Lieutenant Donelson had detached Lieutenant Arnold to connect the reconnaissance with Fort Colville. He travelled along Clarke's Fork to the Mission of St. Ignatius, and crossing the river proceeded to Fort Colville; thence he ascended the Columbia river to the mouth of Clarke's Fork, determining its latitude by sextant observation to be near the 49th parallel. Returning to Fort Colville he followed the Columbia down to the Grande Coulée, explored it, and repaired to Fort Walla-Walla.

Governor Stevens, Captain McClellan, Lieutenant Donelson, and Lieutenant Arnold, went from Walla-Walla to Puget Sound by the Columbia and Cowlitz rivers.

Dr. Suckley performed his voyage safely. He had to make only three portages of any magnitude: one being on Clarke's Fork, above Lake Pend d'Oreille; one at the Dalles of the Columbia; and the other at the Cascades.

The party on the western division, under the command of Captain George B. McClellan, consisted of Lieutenant J. K. Duncan, 3d artillery, Lieutenant S. Mowry, Lieutenant H. C. Hodges, Mr. J. F. Minter, civil engineer, George Gibbs, geologist, and Dr. J. G. Cooper, naturalist. Captain McClellan left Fort Vancouver in July, 1853. His course was in a northerly direction to the Cathlapoot'l; thence in a generally east direction south of Mounts St. Helens and Adams; thence northwest, crossing Atahnam, Nachess, and Wenass rivers, up the valley of the Upper Yakima to the Yakima Pass, which was examined; thence he proceeded to Ketetas; thence north to the Columbia; thence up the right bank of that river to Fort Okinakane, on Okinakane river. The party then examined the Okinakane river up to the lake of that name. From Lake Okinakane river their route was nearly east to Fort Colville; thence nearly south to a branch of the Spokane, where they joined Governor Stevens.

Lieutenant Sylvester Mowry examined a route leading from Wenass river in a south of east direction to the Dalles of the Columbia.

Lieutenant Hodges joined McClellan's party at Ketetas, having marched from Fort Steila-

coom. His course was easterly to the Stkamish river; thence along that stream to the Nachess Pass; thence along Nachess river.

A large map of the Cascade range, north of the Columbia, was prepared by Lieutenant Duncan on a scale of 1 to 400,000.

In 1853 Mr. George Gibbs made a partial examination of the country lying between Shoalwater bay and Puget Sound. On the 17th of December, with a small party, he proceeded up the Willopah river about fifteen miles in a canoe, and then started on foot to explore the route connecting Shoalwater bay with the interior. After three days travel (15 miles) the attempt was abandoned.

On the 10th of October, 1853, Mr. Tinkham left the main train on Jocko river to examine the Maria's Pass. He travelled northerly down the Jocko river to its mouth, and thence followed up the valley of Flat Head river, and along the western shore of the Flat Head lake. He crossed the dividing range through Maria's Pass, and thence his route lay in a southeast direction, crossing the tributaries of Maria's and Teton rivers to Fort Benton.

On November 1, Mr. Tinkham left camp opposite Fort Benton, and travelled in a western direction along the south side of the Missouri to the "Gate of the Mountains." Crossing the Rocky mountain divide through one of the Hell-Gate Passes, he entered the valley of the Little Blackfoot river, followed it down to its junction with the Hell-Gate river; thence down this stream to the Bitter Root river; and thence to Lieutenant Mullan's winter establishment at St. Mary's village.

On the 20th, leaving St. Mary's village, he proceeded up the valley of the St. Mary's river to about sixty miles above Hell-Gate, where the Bitter Root river forks to the southeast and southwest. The route pursued was up the western fork through the Bitter Root mountains; thence along the valleys of the Kooskoosky and Clearwater rivers to Lewis' Fork; and thence to Walla-Walla, which point was reached on the 30th of December.

Mr. Tinkham's route through the Bitter Root mountains was nearly the same as that of Lieutenant McFeely.

On the 17th of January Mr. Tinkham, with two Walla-Walla Indians, proceeded up the Columbia to the mouth of the Yakima; thence up this stream to its source, in the Cascade mountains, passing the summit through the Snoqualme Pass, and thence by the valley of the Snoqualme river to Seattle, on Puget sound; arriving there on the 27th of January, 1854.

On the 22d of September Lieutenant Grover, with a crew of three men, left Fort Benton in a flat boat, and proceeded to survey the Missouri river, to ascertain the practicability of steam-boat navigation between that point and the mouth of Milk river; on completing this he returned to Fort Benton over the route that the main party had travelled. He arrived at the latter point on the 7th October.

Lieutenant Grover, with a dog train, left Fort Benton January 2, 1854, to examine the condition of the route in winter from the headwaters of the Missouri to the Dalles of the Columbia. He followed nearly the route Lieutenant Donelson had taken, *via* Fort Owen, Clarke's Fork, Fort Walla, and the Columbia river.

In May, 1854, Mr. James Doty made a survey of the route from Fort Benton, along the eastern base of the Rocky mountains, to latitude 49° 30′. His party consisted of three men and an Indian boy. He had a compass and odometer, and a sextant and time piece. He followed along the course of the Missouri river to the Great Falls. About fifteen miles from Great Falls the party struck the Medicine river about eight miles from its mouth, and followed

up this stream to the base of the mountains; thence his course was along the east base of the mountains to Maria's river; thence in a nearly north direction to Chief's Mountain lake. On his return the route was nearly south to Maria's river; thence along that stream a short distance; thence south to Birch river; thence southeast to the Teton, which stream was followed to Fort Benton.

Mr. Doty made another reconnaissance in July, 1854, from Fort Benton to St. Mary's, following the same route as pursued by the main train in 1853, to a point within ten miles of the divide of the Rocky mountains. There he turned due west, and crossed the divide. He then followed the general direction of the Blackfoot to its junction with Hell-Gate river; thence he followed up the Bitter Root to St. Mary's and Cantonment Stevens. On the return the party followed the Bitter Root valley to Hell-Gate; thence up that river to the mouth of the Little Blackfoot; thence over nearly the same trail as on the journey from Fort Benton to Cantonment Stevens.

On the 7th of September Mr. Doty left Fort Benton for Olympia. The route lay up the Teton river to the Great North bend; thence southwest to the trail pursued by the main party which led him to Cantonment Stevens, on the Bitter Root river. Leaving the Bitter Root valley he proceeded, by way of the St. Regis Borgia river, to the Cœur d'Alene Mission; whence he pursued a southwesterly course to Fort Walla-Walla. Leaving Walla-Walla he went up the Columbia to the Yakima river; thence up that stream to its source; thence through the Yakima Pass to Olympia.

Lieutenant Mullan being left at Cantonment Stevens, on the Bitter Root river, to make observations in the mountains during the winter, made several reconnaissances. He was assisted by Mr. Adams as topographer and artist. The maps of the routes were made from compass courses and generally estimated distances.

Lieutenant Mullan's first reconnaissance was made in December to Fort Hall, on the Lewis Fork, and back. His route lay up the Bitter Root to its source; thence across the valley of the streams forming the Wisdom river; thence up the valley of the southeast branch of Jefferson Fork; thence into the valley of the Medicine Lodge creek; thence across the Camas prairie to Snake river, (striking it near Market lake;) and thence to Fort Hall. On the 19th of December the party commenced their return to the Bitter Root valley. On reaching the Camas prairie, Lieutenant Mullan diverged to the east of the route by which he went to Fort Hall, and passing the dividing ridge continued a northerly course across the branch of Jefferson Fort. Thence he passed over to the south branch of Hell-Gate river, and proceeding by way of its valley returned to his cantonment.

Lieutenant Mullan again left the Bitter Root valley on the 1st March, 1854, to examine a new route to Fort Benton. This route was up the Hell-Gate river to its junction with the little Blackfoot; thence up that stream to its source, where he crossed the dividing ridge, and proceeded nearly north to the Missouri river and thence to Fort Benton. He went back to the Bitter Root valley over nearly the same route.

An odometer line was run over the whole route, and sketches of the principal features of the country were taken. Lieutenant Mullan on this journey travelled with wagons, and the pass through which he crossed the mountain divide he called the Hell-Gate Pass. It is some times spoken of as Mullan's Pass.

Lieutenant Mullan again left the Bitter Root valley on the 14th April, 1854, to continue the explorations of the country between the main ridge of the Rocky mountains and the Bitter

Root range, as far as the Kootenay river. The route pursued was that along the Bitter Root river; thence to Flathead river, by way of the Jocko river; thence by the west side of Flathead lake; thence up the valley of Maple river to its source; and thence across the divide, between it and the Kootenay river, to this latter stream. The return route was down the valley of Hot Spring creek to Flathead river; and thence by the Jocko and Bitter Root rivers to the place of departure.

Lieutenant Mullan finally left the Bitter Root valley on the 19th of September, 1854, passed up the Looloo Fork and through the Bitter Root mountains; and thence by way of the Kooskoosky to Fort Walla-Walla, his route being nearly that of Captains Lewis and Clarke in 1805–'6.

The reports of each of the reconnaissances made by the subordinates of Governor Stevens' expedition will be found with his printed report; and the various maps of these routes were compiled by Mr. Lambert on the map that accompanies it. Governor Stevens also made additional examinations in 1855, in connexion with his official duties with the Indians, and the results will be published in a supplementary volume.

SURVEY BY LIEUTENANT R. ARNOLD, 1854.

In the summer of 1854 Lieutenant R. Arnold, third artillery, made an odometer survey and map of a road which he opened from Puget Sound to Walla-Walla, through the Nachess Pass, over nearly the same route reconnoitred by Lieutenant Hodges, of Captain McClellan's party in 1853. His report will be found as an appendix to the annual report of Colonel J. J. Abert, Topographical Engineers, forming part of Senate Ex. Doc. No. 1, 1st session 34th Congress.

EXAMINATIONS BY MR. F. W. LANDER, CIVIL ENGINEER, 1854.

The report of Mr. Lander forms part of House Ex. Doc. No. 129, 1st session 33d Congress, and is reprinted in the quarto edition of Pacific Railroad Reports, Vol. II, Senate Ex. Doc. No. 78, and House Ex. Doc. No. 91, 2d session 33d Congress. The report is unaccompanied by maps or sketches.

Mr. F. W. Lander returned to the States in 1854 by the emigrant road up the valley of the Columbia; thence across the Blue mountains through the Grande Ronde; thence up Snake river and across to Bear river; and thence by the usual travelled road through the South Pass and down the Platte river to Missouri.

The journey was undertaken by him at the request of citizens of Oregon and Washington Territories, to endeavor to find a railroad route in this direction. Although he examined several approaches to the Blue mountains from the west, he found no practicable railroad route, as time and means did not permit him to reconnoitre this portion as fully as he intended. It was also his design to examine a route from the source of Snake river, over the mountains, to the head of Green river, but an accident to himself prevented this. His examinations tended to confirm the opinion of the difficult nature of the route west of the South Pass.

EXPLORATION AND SURVEY FOR A RAILROAD ROUTE TO THE PACIFIC, NEAR THE THIRTY-EIGHTH AND THIRTY-NINTH PARALLELS, UNDER CAPTAIN J. W. GUNNISON, TOPOGRAPHICAL ENGINEERS.

The report of this examination was made by Captain E. G. Beckwith, United States artillery, and forms part of Volume II of the quarto edition of the Pacific Railroad Report, Senate Ex. Doc. No. 78; House Ex. Doc. No. 91, 2d session 33d Congress. The maps were prepared by Mr. F. W. Egloffstein, and are in four sheets, on a scale of twelve miles to an inch.

The profile of this route is engraved on a horizontal scale of 30 miles to an inch, and a vertical scale $39\frac{1}{10}$ times greater than the horizontal. Numerous illustrations accompany the quarto edition. This report was also published in House Doc. No. 129, 1st session 33d Congress, and was accompanied by a preliminary map on a scale of 50 miles to an inch, and profile on a horizontal scale of 15 miles to an inch, the vertical scale being 2,000 feet to an inch. A sketch of the portion of the route between the 104th and 110th meridian, on a scale of about 16 miles to an inch, accompanies the report of the Secretary of War—Senate Ex. Doc. No. 29, 1st session 29th Congress.

This expedition was composed of Captain Gunnison, Lieutenant E. G. Beckwith, 3d artillery; Mr. R. H. Kern, topographer; Mr. S. Homans, astronomer; Dr. J. Schiel, surgeon and geologist; Mr. F. Creutzfeldt, botanist; and Mr. J. A. Snyder, assistant topographer; with the necessary teamsters and employés. They were escorted by Captain R. M. Morris and Lieutenant L. S. Baker, and about 30 soldiers of the regiment of mounted rifles. They were provided with sextants and artificial horizons, compasses, odometers, mercurial and aneroid barometers, and instruments for railroad surveying. Their supplies, &c., were transported in wagons.

The main train left Westport on the 16th of June, 1853, and travelled over the Santa Fé road, while Captain Gunnison, with a small party, travelled up the Kansas river to Fort Riley, and, continuing southwest, joined the main party on Walnut creek. The whole expedition now proceeded up the Arkansas to the mouth of the Apishpa creek, where they left it and travelled southward up this branch. Leaving Apishpa creek, they took a route westward, crossed Cuchara creek, struck Huerfano creek, and ascended it to the Sangre del Cristo Pass in the Sierra Blanca. By this Pass they entered the San Luis valley, lying at the head of the Rio Grande. Travelling northwest along the western base of the Sierra Blanca, they examined Roubedeau's Pass, the Sandy Hill Pass, and another at the head of Homans' creek, leading to the Arkansas. Leaving the San Luis valley, by way of Sawatch creek, they ascended this to one of its sources in Coochetopa Pass. Here, crossing the divide, they descended to Grand river, mostly through the valley of Coochetopa creek. Finding it impossible to travel through the cañons of Grand river, they traversed the high and broken mesas south of them to Uncompahgree creek. This they descended to its mouth, and then following Grand river a short distance, crossed over to its northern side. Keeping generally at some distance from its banks, they journeyed westward until, after crossing Blue river, they left Grand river in about latitude 39°, on finding that its course would lead them too far to the south. Continuing their westerly course, they crossed Green river a short distance below the mouth of White river, (the one which comes in from the west.)

Their examination westward was uninterrupted as far as the head of the San Rafael, where they were forced by the Wasatch mountains considerably to the south. They crossed this divide through the Wasatch Pass, and came upon a branch of the Sevier river. They then descended Sevier river to Lake valley, turned south, crossed the Unkuk-oo-ap mountains south of the river, and rejoined it just below where it comes out of the gap through this range. Here the party was separated; Captain Gunnison, Mr. R. H. Kern, Mr. F. Creutzfeldt, Mr. William Potter, and eight men starting to examine Sevier lake on October 25. On the morning of the 26th they were surprised by a large body of Indians of the Ute tribe, and Captain Gunnison, Mr. Kern, Mr. Creutzfeldt, Mr. Potter, and four others were killed. Most of the papers and instruments were recovered. The expedition, the command of which thus devolved upon Lieutenant Beckwith, proceeded to Great Salt Lake city, where the winter was passed.

Messrs. Beale and Heap passed over nearly this same route in advance of Captain Gunnison's party on their way to California. The journey of these enterprising travellers was a very trying one; and they lost nearly everything they had in attempting to cross Grand river on a raft during a high stage of water. They published a brief and interesting narrative of their journey, accompanied by a map.

Colonel J. C. Frémont* also passed over nearly this same route during the winter of 1853–'54. He crossed the Sierra Blanca through the Sandy Hill Pass; thence his route was not materially different from Captain Gunnison's to the point where the latter left Grand river. Colonel Frémont continued further south, and crossed the Sawatch mountains south of Gunnison's route. He had with him, as far as the Mormon settlement, Mr. F. W. Egloffstein, as topographer.

SURVEY FOR A RAILROAD TO THE PACIFIC NEAR THE 41ST PARALLEL, BY LIEUTENANT E. G. BECKWITH, IN 1854.

The report of this route, by Lieutenant Beckwith, forms part of Volume II of the quarto edition of the Pacific Railroad Reports. The topographical maps are in four sheets, on a scale of twelve miles to an inch. The profiles are drawn on a horizontal scale of 16 miles to an inch, the vertical scale being $28\frac{16}{100}$ times larger. This report of Captain Beckwith was also published in House Document No. 129, 1st session 33d Congress, and was accompanied by a preliminary map on a scale of 50 miles to an inch.

On the 3d of April Lieut. E. G. Beckwith, aided by Mr. F. W. Egloffstein and the surviving assistants of Captain Gunnison, started to examine the practicability of the Wasatch mountains east of Great Salt lake. Leaving Salt Lake city, they travelled up the eastern shore of the lake, to the cañon of Weber's river, passed up this stream to White Clay creek, crossed the divide between it and Bear river, travelled along the heads of Muddy creek and Black's Fork, to Henry's Fork of Green river, and then followed down this stream nearly to its mouth.

Retracing their steps to the divide between Muddy and Bear rivers, they attempted to discover a route to the Kamas prairie and Timpanogos river, more direct than the one by White Clay creek and Weber's river. This they were unable to do, being deterred as much by snow as by the rugged aspect of the country. Descending White Clay creek to Weber's river, they followed the latter stream to where it turns east into the Uintah mountains; thence crossing the dividing ridge they reached Timpanogos river, examined its valley to Utah lake, and thence returned to Salt Lake city.

On the 5th of May the expedition, under Lieut. Beckwith, left Salt Lake city under instructions to explore a route "south of Great Salt lake in the direction of the 'Sink' of Humboldt's or Mary's river, thence towards Mud lake, and across to the tributaries of Feather river, and thence by the most practicable route to the valley of the Sacramento." Leaving the city, they crossed the Jordan river, passed around the northern end of the Oquirrh mountains, entered the Tuilla valley, and doubling the northern end of an intervening range of mountains, entered Spring or Lone Rock valley.

Proceeding southwesterly they passed the Cedar and the Pi-ja-ro-ja-bi mountains. Passing this range they continued the exploration westward to a pass in the Wa-ro-ja mountains, by which they entered Franklin valley. They then travelled southward down this valley, along the eastern face of the Humboldt mountains, for twenty or thirty miles, where they turned westward, crossed the mountains through the Hastings Road Pass, and struck the head of the south

* See letter to the editors of the National Intelligencer, which forms House Miscellaneous Document No. 8, 2d session 33d Congress.

fork of Humboldt's river. The exploration was continued westward by a devious route through the mountains south of the Humboldt river to its valley at Lassen's Meadows. Leaving the river, they then explored westward to the southern portion of the valley of Mud lakes. Proceeding thence northwest, they crossed the eastern chain of the Sierra Nevada by the Madelin Pass, and followed Pit river to the mouth of Fall river. Here, leaving Pit river, Lieut. Beckwith travelled by the Old Emigrant road, southward along the elevated plateau between the two chains of the Sierra Nevada, to the Noble Pass road, which he followed through the eastern chain of the Sierra, near Susan's river, to Honey lake. Having connected his recent reconnaissance with the former line near the point where Smoky creek enters Honey Lake valley, Lieut. Beckwith retraced his steps by the Noble's Pass road, through the eastern chain of the Sierra Nevada to the summit plateau. Thence he followed the continuation of the same road through Noble's Pass, in the western chain of the Sierra, to Fort Reading, in the Sacramento valley. Much confusion in ideas, as well as in nomenclature, has arisen from the name "Noble's Pass" being applied indiscriminately to two passes, (as well as to the road between them,) one through the eastern, and the other through the western chain of the Sierra Nevada.

Leaving Fort Reading on July 15, Lieut. Beckwith ascended the Sacramento to Pit river, which he followed to within a few miles of the mouth of Fall river, thus nearly connecting with his former reconnaissance. Turning southward, he then followed Canoe creek to Noble's Western Pass, and thence by the road to Fort Reading, at which point the exploration terminated.

AN EXAMINATION TO ASCERTAIN THE MOST PRACTICABLE LOCATION FOR A WAGON ROAD ALONG THE CARSON VALLEY ROUTE, PASSING NEAR LAKE BIGLER, (CALLED BY FRÉMONT, IN HIS MAP OF HIS SECOND EXPEDITION, "MOUNTAIN LAKE," AND ON HIS MAP OF THE THIRD EXPEDITION LAKE BONAPLAND.)

This examination throws much light on the subject of the practicability of the route for a railroad.

The altitudes were determined by an aneroid barometer. The determination of the eastern boundary of California was another object in the examination, and for this purpose the party used an astronomical transit and sextant with chronometers. The report of these operations, by George H. Goddard, accompanies the annual report of the surveyor general of the State of California. Assembly document No. 5, session of 1856.

SURVEY FOR A RAILROAD ROUTE TO THE PACIFIC, NEAR THE THIRTY-FIFTH PARALLEL, BY CAPTAIN A. W. WHIPPLE, TOPOGRAPHICAL ENGINEERS.

The final report of Captain Whipple forms Volumes III and IV of the quarto edition of the Pacific Railroad Reports, Senate Ex. Doc. No. 78; House Ex. Doc. No. 91, 2d sess. 33d Cong. It is accompanied by a topographical map in two sheets, drawn on a scale of 15 miles to an inch, and a sheet of profiles on a horizontal scale of 15 miles to an inch, and a vertical 50 times the horizontal. There are, besides, geological maps and numerous other illustrations. His preliminary report forms part of House Doc. No. 129, 1st sess. 33d Cong. This edition is accompanied by a map in two sheets, and on scale of 1 to 900,000, and a profile of the route on a horizontal scale of 1 inch to 79,500 feet, and a vertical scale of 1 inch to 3,000 feet.

Captain Whipple was assisted by Lieutenant J. C. Ives, Topographical Engineers; Dr J. M. Bigelow, surgeon and botanist; Jules Marcou, geologist and mining engineer; Dr. C. B. R. Kennerley, physician and naturalist; A. H. Campbell, principal assistant railroad engineer; H. B.

Mollhausen, topographer and artist; Hugh Campbell, assistant astromomer; William White, jr., assistant meteorological observer; Mr. George G. Garner, assistant astronomer; Mr. N. H. Hutton, assistant engineer; John P. Sherburne, assistant meteorological observer; and Mr. T. H. Parke, assistant astronomer and computer. They were provided with a portable transit, sextants, and chronometers, for astronomical observations, and with the other instruments needful for reconnaissances. They were escorted by a company of the 7th infantry, under Captain J. M. Jones, and began the survey with a train of wagons. Lieutenant Ives proceeded, with an astronomical transit and other instruments, from Washington, D. C., to Albuquerque, by way of San Antonio and El Paso, where he joined the party.

Captain Whipple (then a first lieutenant) left Fort Smith July 13, 1853, and moved west, along the northern base of the San Bois mountains, to the south fork of the Canadian river. Crossing this, the party followed its main branch, called Coal creek, to its head; thence crossing Delaware Ridge, they struck the head of Boggy river. Recrossing the Delaware Ridge, they passed along the heads of Walnut and Deer creeks, until, keeping at some distance south of the Canadian, and gradually diverging from it, they crossed a low divide and struck the waters of the False Washita river, at Gypsum creek. Thence they travelled northwest, up the valley for about 60 miles, when they passed over again to the Canadian. They then travelled generally along the valley of the Canadian river, by the Emigrant road, to the Pecos, at Anton Chico. Here the party separated. Lieutenant Whipple, with a small number, followed the Pecos nearly to its head, crossed the Galisteo Pass on the west, and following down the creek of the same name, struck the Rio Grande del Norte at the pueblo of San Domingo. Thence he travelled down the river to Albuquerque. The main party left Anton Chico, followed up the Cañon Blanco to Las Lagunas, thence southwesterly through the San Pedro Pass, at the southern end of the Zandia mountain, and thence down the San Antonio creek to Albuquerque. Lieutenant Whipple remained encamped at this point a month; leaving there about the middle of November, 1853.

While at Albuquerque a reconnaissance was made of the river crossing at Isleta, about 10 miles below.

The escort was increased by twenty-five men, under Lieutenant J. C. Tidball, 2d artillery, and a considerable number of pack animals were now added.

From Albuquerque the expedition travelled southwest to the crossing of the Rio Puerco, thence up the San José or Santa Rita valley to Covero. Soon after leaving Covero, a small party under Mr. Campbell explored a route up the north fork of the Santa Rita to its head, thence through Campbell's Pass, in the Sierra Madre, to Fort Defiance and back to the main party at Zuñi. The main party kept up the South Fork to its head, at the Aqua Fria, thence crossing the Sierra Madre, by a rugged pass, descended the slopes of that range to the Pueblo of Zuñi.*

From this point the exploration was continued westward to the Rio Puerco, (of the west,) crossing it near Navajo Spring, and thence southwest to the Colorado Chiquito, near the junction of the Puerco with the former stream. After following the valley of the Colorado Chiquito for about 40 miles, they struck west towards the San Francisco mountain, passing south of it. Continuing the westward course, which carried them north of Mount Bill Williams' and across the sources of some northern branches of the Gila river, they reached the sources of Bill Williams' Fork, and travelled down the valley of this stream to its junction with the Colorado of the Gulf of California. They now travelled up the Colorado, through the

* An interesting article on the region about Fort Defiance, by Dr. J. Letterman, U. S. A., is published in the Annual Report for 1855, of Professor Henry, Secretary to the Smithsonian Institution.

Mohave valley, and crossed the river in about latitude 34° 50′ north. Leaving the Colorado, they took a northwesterly course to Soda lake. They then passed up the valley of the Mojave river, and through the Cajon Pass, to the rancho of Coco Mungo, and thence along the foot slopes of the Coast range to Los Angelos, where the survey terminated about the 25th of March, 1854.

SURVEY FOR A PACIFIC RAILROAD THROUGH THE PASSES OF THE SIERRA NEVADA AND COAST RANGE, BY LIEUTENANT R. S. WILLIAMSON, TOPOGRAPHICAL ENGINEERS, 1854.

The final report of these surveys and reconnaissances forms Volume V of the quarto edition of the Pacific Railroad Reports. It is accompanied by a general map on a scale of 1 to 600,000; one of certain passes on a scale of 1 to 240,000, and several detailed maps. There are, too, sheets of profiles drawn on a horizontal scale of 1 to 120,000, and a vertical scale five times greater. The report is also accompanied by geological maps and profiles. The report and general map were also in House Document No. 129, 1st session 33d Congress.

Lieutenant Williamson was assisted by Lieutenant J. G. Parke, Topographical Engineers; Lieutenant G. B. Anderson, 2d dragoons; Dr. A. L. Heerman, physician and naturalist; Mr. W. P. Blake, geologist; Mr. Isaac W. Smith, civil engineer; Mr. Charles Preuss, topographer; and Mr. Charles Koppel, artist. His escort was commanded by Lieutenant G. Stoneman, 1st dragoons. Continuous topographical sketches of the routes traversed were taken, and the work checked by astronomical observations with the sextant. Two of the passes were surveyed with chain and spirit level. On the map Lieutenant Williamson embodied some of the explorations of Captain Warner which had not before been published.

The expedition left Benicia on the 10th of July, 1853, and crossed the straits to the town of Martinez. Thence, travelling through Livermore's Pass, and turning southeast, the party crossed the San Joaquin river at Grayson, and proceeded to Fort Miller. From this place they proceeded, *via* Woodville, to the O-co-ya or Pose creek, seven miles north of Kern river, where a depot camp was established for an examination of the passes by small parties. Lieutenant Williamson then surveyed the passes at the head of Kern river—one called Chay-o-poo-ya-pah or Walker's Pass; the other the Hum-pah-ya-mup Pass. Leaving the latter, he proceeded south on the west side of the Sierra Nevada to the Tah-ee-chay-pah Pass, which was surveyed, as was also one a little to the south of it, (the one that Captain Frémont traversed in 1844, and which he calls "Walker's.") Lieutenant Williamson next surveyed the Tejon Pass and the Cañada de las Uvas. In the latter of these passes an extensive and valuable comparison was made of leveling by the barometer and spirit level, the results of which are ably discussed by Lieutenant Abbot, Topographical Engineers, in Volume VI of the Pacific Railroad Reports.

While Lieutenant Williamson was conducting these examinations and surveys, Lieutenant Parke was sent with a party to Los Angeles, examining in his route the San Fernando Pass, near the Mission of that name. From Los Angeles he proceeded up the San Gabriel and Santa Anna valleys, and examined the passes between the San Bernardino and San Gorgonio mountains, called the San Gorgonio Pass. Thence Lieutenant Parke retraced his steps and joined the main party in the Cañada de las Uvas.

Lieutenant Williamson, on the 5th of October, passed through the Cañada de las Uvas, and travelling southward along the base of the mountains, examined the San Francisquito and New Passes. On the 19th of October he made a depot camp on the Mohave river. From this camp

Lieutenant Parke was detached to follow up the Mohave and try to discover a good pass at its source. Mr. Smith, civil engineer, was sent to make an accurate survey of the New Pass, now known as Williamson's Pass. Lieutenant Williamson examined the Mojave river to the cañon where the road leaves the stream, and then returned to the depot camp. After the detached parties were again united, Lieutenant Parke was directed to proceed with the wagon train through the Cajon and San Gorgonio Passes to Warner's Pass, and then examine the latter. This he did, and then proceeded to San Diego.

Lieutenant Williamson descended the Mojave to Soda lake, and thence followed northward to a chain of similar lakes. Having fully determined that there was no Mojave valley reaching to the Colorado, he repaired to Warner's ranche, by the usually travelled road, through the Cajon, and thence by the way of the towns of San Bernadino and Temecula, to Warner's Pass. From this point he proceeded to Fort Yuma, examining the Colorado desert and the Colorado river crossing, and then repaired to San Diego, where the expedition terminated.

RECONNAISSANCE FOR A RAILROAD ROUTE BETWEEN PIMAS VILLAGE AND EL PASO, BY LIEUTENANT J. G. PARKE, TOPOGRAPHICAL ENGINEER, IN 1854.

The report of this reconnaissance forms part of Volume II, quarto edition of the Pacific Railroad Reports. This report is printed in House Ex. Doc. No. 129, 1st session 33d Congress, and is there accompanied by a map on a scale of five miles to an inch, and profile on the same horizontal scale, the vertical being one thousand feet to an inch.

Lieutenant Parke, assisted by Mr. H. Custer, topographer, and Dr. A. L. Heerman, physician and naturalist, and provided with barometers, odometers, and compass, on the 24th of January, 1854, left San Diego with a party of twenty-three men, exclusive of an escort, under Lieutenant Stoneman, of twenty-eight dragoons. They followed the emigrant road, via Warner's ranche and Pass, and across the Colorado desert, to Fort Yuma; thence they travelled up the left bank of the Gila river to the Pimas and Maricopas villages. Leaving this point, on the 16th of February, they turned southeast to the then Mexican towns of Tucson and San Xavier. Continuing southeastward they passed through the Cienega de las Pimas to the Rio San Pedro, and travelled up that stream thirty or forty miles; thence striking over the hills, on the right bank, to the Playa de las Pimas, and crossing it at its southern extremity, they entered the Chiricahui mountains, at the Puerto del Dado, south of Dos Cabezas Peaks; thence they travelled east, crossing the mountains on the eastern side of the Valle de Sauz, near the Gavilan Peak. Turning now to the northeast, they crossed the next mountain range near the Pyramid Peak, and travelled east to the Ojo de Inez, near which they struck Cooke's wagon road, and followed it to Fort Fillmore. Lieutenant Parke returned from Fort Fillmore with a small party and examined a route direct between that place and Cooke's Spring. From Fort Fillmore the party proceeded to El Paso, where the reconnaissance ended.

RECONNAISSANCE FOR A RAILROAD ROUTE FROM EL PASO TO PRESTON, BY BREVET CAPTAIN JOHN POPE, TOPOGRAPHICAL ENGINEERS, 1854.

The report of this reconnaissance will be found in Volume II of the quarto edition of the Pacific Railroad Reports, and is accompanied by a map on a scale of fifteen miles to an inch, and a profile on the same horizontal scale, the vertical being fifty times greater. The report, with a map and profile, on a scale of ten miles to an inch, also forms part of House Doc. No. 129, 1st session 33d Congress.

Captain J. Pope was assisted by Lieutenant Kenner Garrard, first dragoons; Dr. J. Mitchell, surgeon and naturalist; Mr. C. L. Taplin, and J. H. Byrne, with an escort of twenty-five men under Lieutenant L. H. Marshall, third infantry. The party, including teamsters, &c., numbered seventy-five men. They were provided with sextant, chronometer, odometer, and compasses. The grades were determined by measuring the vertical angle with a theodolite. The expedition left Doña Ana February 12, 1854. Passing through the Organ mountains, they struck southwest to the pass at Cerro Alto, in the Hueco mountains. From this point Lieutenant Garrard was sent to El Paso to connect the two points by survey. From Cerro Alto the expedition moved eastward to the Guadalupe Pass, passing by the way of the Cornudos de los Alamos. Lieutenant Garrard explored the Guadalupe range some distance to the south, and joined the main party at the head of Delaware creek. On reaching the Pecos, Lieutenant Marshall explored it up to the mouth of the Sacramento river, and Mr. Taplin was sent across the Llano Estacado to the Sulphur Springs. The main party then moved down the Pecos to the emigrant crossing; thence east over the usual road to the Big Springs of the Colorado; and thence northwest to the Sulphur Springs. Lieutenant Garrard was sent back from this point to the Pecos, at the mouth of Delaware creek, to survey the direct route between the two places. From the Sulphur Springs the whole party travelled a very direct course to Fort Belknap; thence northeast to the west fork of the Trinity; and thence eastward to Preston, where their examinations terminated.

Captain Pope made additional explorations in the vicinity of the Guadalupe mountains during the years 1855–'56–'57, while engaged in the experiment for obtaining water by artesian wells, but his final report has not yet been made.

EXPLORATION AND SURVEY FOR A RAILROAD ROUTE FROM BENICIA, CALIFORNIA, TO FORT FILLMORE, NEW MEXICO, BY LIEUTENANT J. G. PARKE, TOPOGRAPHICAL ENGINEERS, 1854–'55.

The report of these examinations form part of Volume VII of the quarto edition of the Pacific Railroad Reports, and is accompanied by two topographical maps, on a scale of twelve miles to an inch, and profiles of his routes on the same horizontal scale, and a vertical scale fifty times larger. On the same sheet is a profile of the route from Fulton to San Diego, on a horizontal scale of thirty-six miles to an inch, and a vertical scale fifty times greater. There are also geological maps and profiles.

Lieutenant Parke was assisted by Mr. Albert H. Campbell, civil engineer; Doctor Thomas Antisell, geologist; and Messrs. Custer and N. H. Hutton, topographers. They were provided with sextants and chronometers, barometers, compasses, and odometers. On the 20th November, 1854, they left Benicia with a party of about thirty persons, crossed the Straits of Carquinez to Martinez, and proceeded up the Arroyo de las Neuces to the head of the San Ramon valley. Turning south they crossed the Coast range near the San José Mission, from which they travelled around the end of San Francisco bay to the Puebla de San José. They then turned up the San José valley, crossed over the Gavilan range at the source of Pajaro river, and examined the passes in this vicinity.

The route then lay up the broad valley of the Salinas (or Monterey) river, until reaching a point about twenty miles above the Soledad Mission, where the wagon train turned southwest over the mountains to the head of San Antonio Pass. A thorough examination was then made of all the mountain region between Point Conception and Fort Tejon in the Cañada de las Uvas; upon the termination of which the expedition proceeded to Los Angelos.

Lieutenant Parke's instructions requiring him to examine the sink of the Mojave and Soda lakes, he proceeded to a favorable point near the Cajon Pass, where he formed a depot camp, whence, with pack mules, he made the examinations required, and then proceeded with all his party to San Diego, reaching it in April, 1854.

About the 26th of May they started for the Pimas villages, upon reaching which the survey for a Pacific railroad was recommenced. One party, under Mr. Campbell, (with the wagons,) proceeded to Tucson over the usual Emigrant road, while Lieutenant Parke, with the pack mules, continued up the Gila to the mouth of the San Pedro river, up which he travelled until he crossed his route of the preceding year. Here the parties were reunited, and explorations made of the various passes eastward through the mountains bordering the San Pedro and separating it from the Playa de las Pimas. The command then proceeded east to the Playa de las Pimas, when they again divided; the main train proceeding through the Chiricahui mountains by the Puerto del Dado, whilst Lieutenant Parke, with a small party and two wagons, made a reconnaissance around the northern end of those mountains, discovering an easy and practicable railroad route. The parties united in the Valle de Sauz. They then crossed the Peloncillo range near a peak of that name, travelled across the Valle de las Playas, and passed around the northern end of Pyramid range. About forty miles east of El Peloncillo they struck the wagon road near the Ojo de Inez, which the train now followed to Fort Fillmore. From Ojo de Inez examinations were made south of the wagon road along a proposed route for the railway, crossing the Mimbres twenty miles south of the road, and passing the mountains by the Florida Pass, twenty miles south of the Picacho de los Mimbres. At Fort Fillmore the field operations terminated.

EXPLORATION AND SURVEY FOR A RAILROAD ROUTE FROM THE SACRAMENTO RIVER TO THE COLUMBIA RIVER, BY LIEUTENANT R. S. WILLIAMSON, TOPOGRAPHICAL ENGINEERS.

The report of this expedition, owing to the illness of Lieutenant Williamson, was written by Second Lieutenant H. L. Abbot, Topographical Engineers. It forms Volume VI of the quarto edition of the Pacific Railroad Reports, and is accompanied by a topographical map, in two sheets, on a scale of 12 miles to an inch, and two sheets of profiles, on the same horizontal scale, but with the vertical scale 50 times greater.

The party consisted of Lieutenant R. S. Williamson, Topographical Engineers, assisted by Lieutenant H. L. Abbot, Topographical Engineers, with Dr. J. S. Newberry, as geologist; Dr. E. Sterling, as physician and naturalist; Mr. H. C. Fillebrown, as assistant engineer; Mr. C. D. Anderson as computer; and Mr. John Young, as draughtsman. A light cart was taken for the instruments, but everything else was transported by pack mules. The party was supplied with sextants and chronometers, odometers, compasses, and barometers.

The expedition left Benicia, California, on July 10, 1855, and proceeded up the Sacramento Valley to Fort Reading, crossing the river at Frémont. At the fort it was joined by the escort, consisting of Lieutenant H. G. Gibson, 3d artillery; Lieutenant G. Crook, 4th infantry; Lieutenant J. B. Hood, 2d cavalry, and one hundred soldiers.

From Fort Reading the route led westward over the western chain of the Sierra Nevada, which was crossed by Noble's Pass. The valley of Canoe creek was then followed to Pit river. Here Lieutenant Hood was overtaken and relieved by Lieutenant P. H. Sheridan, 4th infantry. The party then proceeded up Pit river to the head of Round valley, struck across to Wright

lake, and thence to Lost river, near the Natural Bridge. From this place the main party, in charge of Lieutenant Abbot, proceeded to Upper Klamath lake by the valley of Lost river, while Lieutenant Williamson, with a detached party, followed round the western shore of Lower Klamath lake.

A junction having been effected, the whole party followed Klamath river to Klamath marsh, and thence struck across to Des Chutes river. Lieutenant Williamson, with a detached party, then explored among the mountains, while Lieutenant Abbot, with the main party, followed down the valley. A junction was effected near the Three Sisters, where a depot camp was made. Here the main party remained, while Lieutenant Williamson, with a few men, continued the exploration of the Cascade range in the vicinity; and Lieutenant Abbot proceeded, with another small party, down the valley to Fort Dalles. Finding that the cañons, in which the tributaries of the Des Chutes river flowed, were so enormous as to render a railroad utterly impracticable, he returned to the depot camp, where a final separation took place.

Lieutenant Williamson, after sending the greater part of the escort to Fort Lane, surveyed a pass through the Cascade range near Diamond Peak, and proceeded down the Willamette valley to the Columbia river. He then sailed to San Francisco, to prepare for further explorations in the Sierra Nevada. Lieutenant Abbot again turned towards the north, and, after exploring the vicinity of the Fort Hills, crossed the Cascade range near Mt. Hood by an hitherto unknown pass, and then followed down the Willamette valley to the Columbia. Being joined here by the party left by Lieutenant Williamson, he proceeded, in accordance with his instructions, to examine the route to Fort Reading lying west of the Cascade range. He followed up the Willamette valley to the Calapooya mountains, crossed them by an excellent railroad pass, traversed the Umpqua valley, and reached Rogue River valley, by the Umpqua cañon, through the Umpqua mountains. After crossing Rogue River valley, he passed over the Siskiyou mountains, by the wagon route, near the head of Stewart creek, and then travelled through Shasta valley to Yreka. The route then led over Little Scott's mountains to Scott's valley, up which he passed to its head. He then crossed Scott's mountain to Trinity river, and, after following the stream about 25 miles, left it to pass over the Trinity mountains. The headwaters of Clear creek were then struck, and the stream followed nearly to Shasta; thence the route lay through the Sacramento valley, for 17 miles, to Fort Reading, where the field work terminated.

In making the map of this exploration, Lieutenant Abbot embodied various unpublished military reconnaissances made in Oregon and northern California, which he duly acknowledges. These were: that by Major Alvord, in 1853, from Myrtle creek, in Umpqua valley, to Rogue River valley; that by Mr. G. Gibbs, in 1852, from Humboldt bay to the head of Scott's river; that of Lieutenant Chandler, in 1856, near the mouth of Rogue river; that of Lieutenant Kautz, in 1854, near Coos bay; those of Lieutenant Williamson from Yreka, east of Shasta Butte, to Fort Reading; from Yreka to lower Klamath lake; and from Port Orford to Coquille and Rogue rivers, made while on military duty in the department in 1851-'52.

UNITED STATES AND MEXICAN BOUNDARY SURVEYS.

These surveys began in 1849, and continued, with various interruptions, till 1856. During the establishment of the boundary line agreed upon by the treaty of Guadalupe Hidalgo, four different appointments were made of United States commissioner, four of astronomer, and two of surveyor. Delays were caused by these changes, by a want of means to properly carry on the work, and by differences of opinion as to the proper initial point on the Rio Grande.

The following named reports can be consulted in relation to it:

1st. The reports of the Secretary of the Interior, one dated February 27, 1850, printed Senate Ex. Doc. No. 34, 1st session 31st Congress; and another dated July, 1852, which is printed Senate Ex. Doc. No. 119, 1st session 32d Congress.

These contain various letters from different individuals and sketch maps in reference to the initial points of the boundary line on the Pacific shore, at the juncture of the Gila and Colorado rivers, and on the Rio Grande.

2d. Extract from a journal of an expedition from San Diego, California, to the Rio Colorado, from September 11 to December 11, 1849, by A. W. Whipple, lieutenant United States Topographical Engineers; printed Senate Ex. Doc. No. 19, 2d session 31st Congress.

3d. Report of Lieutenant Colonel J. D. Graham, Topographical Engineers, Senate Ex. Doc. No. 121, 1st session 32d Congress.

This is a narrative by Colonel Graham of his connexion as astronomer with the establishment of this line, and is accompanied by numerous letters from different persons. One of which is Lieutenant Whipple's report to Colonel Graham on the survey of the Gila. This report of Colonel Graham is also accompanied by a "barometric profile of the route from San Antonio *via* Castorville, Fort Inge, Howard's Spring, Ojo Escondido, Eagle Spring, El Paso del Norte, and Doña Ana, to the Copper mines of Santa Rita, in New Mexico, in 1851; from observations by and under the direction of Brevet Lieutenant Colonel J. D. Graham, United States Topographical Engineers, assisted by Lieutenant W. F. Smith, Topographical Engineers, and Mr. J. Lawson, and computed by Lieutenant G. Thom, Topographical Engineers." The profile is on a horizontal scale of twenty mile to an inch, the vertical scale being $105\frac{6}{10}$ times greater.

Colonel Graham acknowledges, in terms of commendation, the aid received by him from Lieutenant Whipple, Topographical Engineers, Lieutenants Tillinghast and Burnside, United States army.

4th. "*Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, connected with the United States and Mexican Boundary Commission, during the years* 1850–'51–'52, *and* '53. *By John Russell Bartlett, United States Commissioner during that period; in two volumes, with maps and illustrations. Published by D. Appleton & Co., Nos.* 346 *and* 348 *Broadway, New York, and No.* 16 *Little Britain, London.*—1854."

In page 11 of the preface to this work, Mr. Bartlett says: "The maps of the survey, as well as the astronomical, magnetic, and meteorological observations, with all that strictly appertains to the running and marking the boundary line, were, by the instructions of the Secretary of the Interior, placed in charge of the surveyor, Brevet Major W. H. Emory, who alone is held responsible for the faithful performance of these duties. From the high character of that officer as an engineer, the public may expect, in proper season, a satisfactory account of his labors in these departments. Sometime must elapse before the maps to illustrate the whole boundary from one ocean to the other can be completed; I have therefore been compelled to construct, meanwhile, the map prefixed to this work from my own itinerary and from the most authentic information that could be obtained."

This work contains, among other things of interest, an account of the country south of the boundary, on the route from El Paso *via* the Guadalupe Pass to Guaymas; and also of a journey through Chihuahua, Coahuila, and New Leon, to the Rio Grande.

5th. "Report on the United States and Mexican Boundary Survey, made under the direction of the Secretary of the Interior, by William H. Emory, major first cavalry and United States Commissioner. Washington: Cornelius Wendell, printer.

The report of Major Emory was published in 1858, and forms Senate Ex. Doc. No. 108, 1st session 34th Congress, and, with the appendices, makes two volumes. There are four topographical maps on a scale of 1 to 600,000, "showing the boundary line and the country contiguous, as far as information has been obtained from actual survey or reconnaissance." There is also a topographical map on a scale of 1 to 6,000,000, entitled a "Map of the United States and their Territories between the Mississippi River and the Pacific Ocean and part of Mexico, compiled from surveys made under the order of W. H. Emory, major 1st cavalry, United States commissioner, and from the maps of the Pacific railroad, General Land Office, and the Coast Survey, projected and drawn under the supervision of Lieutenant N. Michler, Topographical Engineers, by Thomas Jekyll, C. E., 1857–'58." This map (of all the country north of the surveys of the Mexican boundary) is a reduction from the map which I have compiled for the Pacific railroad office.

During the time I was engaged on this compilation, the Pacific Railroad office was supplied with information from the office of Mexican Boundary Survey, and in return copies of our compilation were furnished that office in advance of its publication. Major Emory's report is also accompanied by a geological map of the same country, and on the same scale as that just mentioned, prepared by James Hall, assisted by J. P. Leslie, esq. This map is without date.

There is also a barometrical and geological profile along the Rio Grande from its mouth to El Paso, and thence across the country to the Pacific. The report contains numerous illustrations of scenery, and geological, botanical, and zoological plates.

Assistance is acknowledged to have been received in the field from Lieutenant A. W. Whipple, Topographical Engineers, Brevet Captain E. L. F. Hardcastle, Topographical Engineers, Mr. G. C. Gardner, Dr. C. Parry, Messrs. E. Ingraham, C. Radziminski, Arthur Schott, J. H. Clark, S. W. Jones, E. A. Phillips, J. H. Houston, J. E. Weiss, H. Campbell, F. Wheaton, W. White, and G. G. Garner.

The line, as finally determined and established under the treaty of Guadalupe Hidalgo, extended up the Rio Grande from its mouth to latitude 31° 54′ 40″ north; thence west along that parallel to the meridian of 109° 37′ west; thence due north to the Rio San Domingo; thence down that stream to the Gila; thence down the Gila to its mouth; thence in a straight line to the point on the Pacific, in latitude 32° 32′ north.

Numerous reconnaissances were made by different parties in going to and from various points on the line; and the Rio Grande was surveyed as far up as the parallel of 32° 22′ north, and a portion of that parallel run by Lieutenant Whipple as directed by Mr. Bartlett, commissioner at the time.

The treaty of 1853, by which the tract of territory known as the Gadsden purchase was acquired from Mexico, changed the boundary line so as to make it commence on the Rio Grande at latitude 31° 47′ north; thence due west 100 miles; thence south to latitude 31° 30′ north; thence due west to the 111th meridian; thence in a straight line to a point on the Colorado twenty miles below its junction with the Gila; thence up the Colorado to the former line.

To establish this boundary Major Emory, (then brevet major corps Topographical Engineers,) was appointed commissioner and astronomer on the part of the United States; and the work was accomplished during the years 1855–'56. Major Emory was assisted in this work by Lieutenant N. Michler, Topographical Engineers, Lieutenant C. N. Turnbull, Topographical Engineers, Messrs. C. Radziminski, M. T. W. Chandler, J. H. Clark, H. Campbell, W. Emory,

M. Von Hippel, C. Weiss, F. Wheaton, A. Schott, J. Houston, D. Hinkle, B. Burns, E. A. Phillips, and J. O'Donoghue. Captain G. Thom, Topographical Engineers, had charge of the office in computing the work and projecting the maps of both boundary surveys.

SURVEY OF ROAD FROM BIG SIOUX TO MENDOTA, BY BREVET CAPTAIN J. L. RENO, UNITED STATES ORDNANCE, IN 1853.

Captain Reno was assisted in this survey, which was made with chain and compass, by Mr. James Tilton (now surveyor general of Washington Territory) and Mr. A. Cross.

The map now in the Topographical Bureau has never been published. The report forms printed House Ex, Doc. No. 97, 1st session 33d Congress.

EXPLORATIONS OF THE SOURCES OF THE BRAZOS AND BIG WITCHITA RIVERS, BY CAPTAIN R. B. MARCY, FIFTH INFANTRY, IN 1854.

The report of this forms Senate Executive Document, No. 60, 1st session 34th Congress. It is accompanied by a map of the region explored on a scale of eight miles to an inch. Captain Marcy was accompanied by Major Neighbors, Indian agent, and Dr. G. G. Shumard, geologist, and escorted by 45 men of the 7th infantry, under Lieutenants N. B. Pearce and G. Chapin. An odometer, compass, aneroid barometer, and thermometer, composed his main instruments.

The object of the expedition was to find suitable lands to reserve for the Indians.

The command was organized at Fort Washita, and proceeded thence, on the California road, to Fort Belknap. Captain Marcy then explored north along the headwaters of the West Fork of the Trinity, thence across the head streams of the Little Witchita, and over into the valley of the Big Witchita. Here, in longitude 99½°, he left his wagon train, and with a small pack train ascended to the head of the Big Witchita, and thence southwest, crossing the head streams of the Brazos, where they issue from a small range of mountains about as high as the Witchita mountains. He now travelled south until he crossed the South Fork, and thence came east until he struck the Qua-qua-he-no or Paint creek, thence northeast, until he struck the Brazos, where he met his wagon trains. The expedition now proceeded south, explored a portion of the Clear Fork, located on it a reservation for the southern Camanches, and then went back to Fort Belknap. Captain Marcy ascertained that what had heretofore been called the Double Mountain Fork of the Brazos is a branch of the Clear Fork, and he calls it Paint creek. I have retained the name Double Mountain Fork. No astronomical observations being made, he adopted the positions of Forts Belknap and Phantom Hill, from Johnson's map of Texas.

FUR HUNTERS OF THE FAR WEST, BY ALEXANDER ROSS, IN TWO VOLUMES; PUBLISHED BY SMITH, ELDER & Co. LONDON: 1855.

This book begins with the transfer of Astoria to the British Northwest Company, and gives the history of this company down to its union with the Hudson's Bay Company in 1821, which closes the 1st volume. The 2d volume is a narrative of some expeditions conducted by the author for the Hudson's Bay Company in 1825 and previous years. On one of these he led a large trapping party into the Snake country, and visited the sources of Salmon, Malade, Goddin's, and Reid's or Boisé rivers, giving a very interesting account of much country as yet unexplored by any surveying expedition, and, I believe, undescribed in any other book. The information concerning it is of great value and interest.

The author, in speaking of the great amount of information required by the members of these fur companies, and the little that has been given to the public, says that it has not been kept secret from design, but merely from inability to make it public.

There are many works of travels and adventures on the prairies mentioned in this memoir, but I have endeavored to refer to most of those containing accurate information of country not covered by the official surveys.

MARCH OF THE COMMAND UNDER COLONEL STEPTOE FROM FORT LEAVENWORTH TO CALIFORNIA, 1854–'55.

The report of Captain Rufus Ingalls, who was quartermaster to this command, forms a portion of the printed annual Executive Document of 1855, part 2. A map showing the routes of portions of the command from Salt Lake city west, is also a part of the same document, and was furnished by Captain Ingalls. The command started from Fort Leavenworth during the first part of June, 1854, and travelled the usual route *via* Fort Kearny, Fort Laramie, South Pass, and Bear river, to Great Salt Lake city, where they spent the winter.

It was the intention to take a new route thence to California south of those usually travelled; but an examination made near Salt Lake city determined Colonel Steptoe to abandon this idea and take the usual emigrant road to the west of the Great Salt lake. This road led him along the Humboldt river to the sinks. He crossed the Sierra Nevada between the sources of Carson's and American rivers. At Lassen's Meadows Captain Ingalls diverged to the northwest, by way of Goose lake, to Fort Jones and Fort Lane, following the Oregon emigrant road.

Lieutenant S. Mowry, who accompanied Colonel Steptoe, was detached at Great Salt Lake city, in the spring of 1855, to conduct some dragoon recruits and animals by the Santa Fé trail to Fort Téjon, in California. This duty he performed. His report was rendered to the adjutant general, but has not been published. It was not illustrated by any topographical sketches.

SURVEY OF MILITARY ROAD IN OREGON, BY LIEUTENANT JOHN W. WITHERS, IN 1854.

The map, with descriptive notes, is on file in the Topographical Bureau. It is drawn on a scale of two miles to an inch. The road is located along the valley of Umpqua river, between Scottsburg and Myrtle creek. The report of Lieutenant Withers accompanied the annual report of the Colonel of Topographical Engineers for 1855.

SURVEYS AND RECONAISSANCE BY LIEUTENANT G. H. DERBY, TOPOGRAPHICAL ENGINEERS, IN OREGON AND WASHINGTON TERRITORIES, 1854 AND 1855.

The principal of these examinations were for a road from Salem to Astoria, in Oregon, and from Columbia barracks to Fort Steilacoom, in Washington Territory. The maps are on file in the Topographical Bureau, drawn on a scale of 1 to 48,000. There are also reductions of these (made in the Topographical Bureau) to a scale of four miles to an inch. These surveys and maps were made by direction of Major H. Bache, Topographical Engineers, by Lieutenant Derby, assisted by Mr. George Gibbs and C. M. Bache. A brief report in relation to these routes will be found in the annual report of the Colonel of Topographical Engineers for 1855.

RECONAISSANCE OF THE ROUTE OF THE SNAKE RIVER EXPEDITION, BY LIEUTENANT G. H. MENDELL, TOPOGRAPHICAL ENGINEERS, 1855.

I have never seen Lieutenant Mendell's report. The reconnaissance was probably made by means of compass courses and estimated distances, checked by astronomical observations for latitude. A tracing from his original map is in the Topographical Bureau.

This expedition, consisting of about two companies, all mounted, under the command of Brevet Major G. P. Haller, fourth infantry, was organized by General Wool, in the summer of 1855, for the purpose of chastising the Indians who had killed some emigrants near Fort Boisé. Leaving the Dalles, the expedition followed on or near the South Pass emigrant road, to about 70 miles to the east of Fort Boisé. They then took the new emigrant route, through Kamas prairie, known as Jeffries' cut-off. (From the Kamas prairie an examination was made south to the Snake river.) On arriving at the junction of the Kamas Prairie creek with the Malade river, the expedition turned to the north and proceeded up this to its source; thence over to Goddin's river; and thence in a northerly course over to the Pash-a-ma-rah creek, which they followed to its junction with Salmon river. This latter stream was examined to the mouth of its eastern branch, called Mormon river, where the Mormon settlement of Lemhi is located. Returning, the expedition ascended Salmon river to its source, and then taking a northwest course, passed along the sources of the Moorumba and the Pashewahkite branches of the Salmon river. In a valley of the latter tributary they came upon some of the Indians whom they were seeking, and inflicted a severe chastisement. From this stream they turned southwest, crossing the mountains to the source of Payette river, which they followed to within twenty miles of its mouth, and then left to proceed directly to Fort Boisé. They returned the remainder of the way on the route by which they went out.

SURVEYS OF ROADS IN MINNESOTA, UNDER CAPTAIN J. H. SIMPSON, TOPOGRAPHICAL ENGINEERS.

Captain Simpson's annual report for 1855, with a map on a scale of twenty-four miles to an inch, showing all the general government roads under his charge, forms a part of the annual executive document for that year. One of these roads extends from Point Douglas, on the Mississippi, to the mouth of St. Louis river; another from Point Douglas to Fort Ripley; another from Fort Ripley, on Crow Wing river, to Otter Tail lake; and another from the Mendota to the mouth of the Big Sioux river. These are the principal roads. The one last mentioned was surveyed by Captain Reno in 1853.

RECONNAISSANCE IN THE DAKOTA OR SIOUX COUNTRY, BY LIEUTENANT G. K. WARREN, TOPOGRAPHICAL ENGINEERS, IN 1855.

The report of this forms Senate Executive Document No. 76, 1st session 34th Congress. It is accompanied by a map on a scale of 1 to 600,000, giving the detailed topography of the routes explored, and a general map of Nebraska, on a scale of 1 to 3,000,000.

While making this reconnaissance I was attached to the staff of General Harney, commanding Sioux expedition, and was assisted by Mr. P. Carrey and J. H. Snowden. Sketches of routes were also furnished me by Lieutenant G. T. Balch, U. S. Ordnance, and Lieutenant J. Curtiss, 2d infantry. The instruments used consisted of odometers, compasses, and barometers. I left St. Louis on the 7th of June, and proceeded up the Missouri to Fort Pierre. A reserve was laid off and surveyed for that post, and the Missouri examined as far up as the mouth of the Shyenne. On the 7th of August, in company with Mr. Carrey, I left Fort Pierre, with six men and one cart, for Fort Kearny, which point was reached on the 21st of August. Here, joining General Harney, I accompanied the army along the Platte on the route to Fort Laramie, at which place the last barometer was broken. From Fort Laramie the expedition went to Fort Pierre, over the route along White river, through the Bad lands, and along the ridge between the Little Missouri and Big Shyenne rivers. From Fort Pierre I returned to the

mouth of Big Sioux, through Minnesota, in company with a train under Captain Van Vliet. Over the routes travelled the distances were measured with an odometer, and maps were made of all the routes traversed.

RECONNAISSANCE OF A ROAD FROM FORT LEAVENWORTH TO THE BIG TIMBERS ON THE ARKANSAS, BY LIEUTENANT F. T. RYAN, TOPOGRAPHICAL ENGINEERS, IN 1855.

The map of this is in the Topographical Bureau, but neither it or the report have been published.

The party under Lieutenant Bryan consisted of Mr. J. Lambert, topographer; Mr. C. Lombard, road surveyor; Mr. C. F. Larned and S. M. Cooper, assistant topographers. Their instruments consisted of compasses and odometers. Having surveyed the route from Fort Leavenworth to Fort Riley, they were joined there by an escort under Major L. Armistead.

On the 4th of August they left Fort Riley, travelled west along the north side of the Kansas to the Saline Fork, crossed it, followed up Smoky Hill creek to its source, passed over to the Smoky Hill Fork, and thence southwest to Pawnee Fork. Following up Pawnee Fork of the Arkansas to its source, they crossed over to the Arkansas and travelled up it to Bent's new fort at the Big Timbers. Their return route differed but little from the one just described, being, however, more direct from the Arkansas to the Smoky Hill Fork, which took them a portion of the way along Walnut creek.

RECONNAISSANCE BY LIEUTENANT J. C. AMORY, FROM FORT GIBSON TO BENT'S FORT, IN 1855.

Lieutenant Amory was attached to the command of Lieutenant Colonel Morrisson, who left Fort Gibson and travelled up the Verdigris as far as the Kansas boundary. Here they left that river and proceeded northwest, gradually approaching the Arkansas until they struck it at the mouth of Walnut creek; thence they proceeded over the usual road to Bent's Fort. Their route from Fort Gibson to the mouth of Walnut creek was through country previously unexplored.

RECONNAISSANCE BY MAJOR MERRILL, UNITED STATES DRAGOONS, IN 1855.

This consists in a sketch of the route of a portion of the 2d dragoons from Fort Belknap direct to Council Grove and Fort Riley.

MAP COMPILED BY LIEUTENANT I. N. MOORE, UNITED STATES DRAGOONS, IN 1855.

This map embraces the country between the Rio Grande and Pecos, from the thirty-second parallel to the thirty-sixth, and is compiled from examinations, sketches, and notes taken by himself, Major Carlton, Lieutenant Higgins, and other officers of the army, while traversing this region on Indian scouts, &c. The positions of the main points along the Rio Grande, Canadian route, and upper El Paso route, are taken from the published maps of the Topographical Engineers.

RECONNAISSANCE BY LIEUTENANT E. L. HARTZ, UNITED STATES EIGHTH INFANTRY, 1856.

Lieutenant Hartz, with a command of three non-commissioned officers and twenty-four men, with two wagons, started on the 16th of August from Fort Davis to intersect the El Paso road. His general course was nearly west, but with many detours to obtain water. He passed through the Carisso Pass, which is difficult for wagons, and struck the El Paso road twenty-five miles west of Eagle Springs. A map of this route was made by Lieutenant Hartz, on a scale of one inch to five miles. It is not stated in his report or map what instruments were employed in reconnoitring.

EXPLORATIONS FOR ROAD FROM FORT RILEY TO BRIDGER'S PASS, BY LIEUTENANT F. T. BRYAN, TOPOGRAPHICAL ENGINEERS, 1856.

The report of this will be found in the annual documents accompanying the President's message for 1857. The original map, on a scale of 1 to 600,000, is in the Topographical Bureau, and was not published with it. Lieutenant Bryan was assisted by Mr. J. Lambert, Mr. C. F. Larned, Mr. S. M. Cooper, assistant topographers, and Mr. H. Englemann, as geologist. They were provided with odometers, compasses, barometers, and sextant. They were accompanied by thirty men, and protected by an escort of one company of the 6th infantry, under Major L. A. Armistead.

They left Fort Riley in June, 1856, and followed up the Republican Fork of the Kansas to the 40th parallel, when they crossed over to the Platte, near Fort Kearny. From this point they travelled up the Platte and South Fork to Lodge Pole creek, up which the main party proceeded. At the mouth of Lodge Pole creek Mr. Lambert was directed to ascend the South Fork to the mouth of Pawnee creek, examine this to its source, then to proceed west to the Emigrant road, and, by following it northward, to join the main party on the Lodge Pole creek. This junction having been effected, the whole command proceeded west to the source of Lodge Pole creek, passed the Black Hills, continued westward, south of the Medicine Bow Butte, crossed the Platte, and reached the divide between the waters of the Platte and Green river, in the neighborhood of Bridger's Pass.

On their return they passed north of the Medicine Bow Butte, crossed the Black Hills at the source of Cache â la Poudre creek, and travelled down it to the south fork of the Platte. At the head of Cache â la Poudre Mr. Lambert was detached, and proceeded east, along the source of Howard's creek to Crow creek, down which he travelled, joining the main party at its mouth. The whole party now proceeded down the South Fork to near the mouth of Pawnee creek, where they left it. Striking east, they came upon the Rock creek branch of the Republican Fork, and examined it down to the main stream. The main party continued down the Republican to Fort Riley. In about longitude 99° 30′, Lieutenant Bryan, accompanied by Mr. Larned and Mr. Cooper, left the Republican, and turning south struck Solomon's Fork and explored it to its mouth. Thence they proceeded to Fort Riley.

SURVEY OF ROAD FROM OMAHA CITY TO FORT KEARNY, BY CAPTAIN JOHN H. DICKERSON, A. Q. M. IN 1856.

The report of Captain Dickerson is published with the documents accompanying the President's annual message for 1857, but without the map, which is in the Bureau of Topographical Engineers, under the direction of which the survey was made. This survey, from Omaha to the Platte, and along that river to Fort Kearny, was made with a chain and compass and spirit level.

A survey was made, with compass and odometer, of the route up the Loup Fork, on the south side, leaving it near the mouth of Beaver creek.

RECONNAISSANCE FROM FORT RANDALL TO FORT KEARNY, BY LIEUTENANT W. D. SMITH, SECOND DRAGOONS, IN 1856.

A reconnaissance was made of this route during the march of a squadron of the 2d dragoons, under Lieutenant W. D. Smith. The report is accompanied by a sketch map, made from the measured distances, but without compass courses. The report has not been printed.

RECONNAISSANCE FROM FORT RIDGELY TO FORT PIERRE, BY CAPTAIN A. SULLY, SECOND INFANTRY, IN 1856.

A reconnaissance was made of this route by Captain Sully, whose company formed part of the command of Lieutenant Colonel Abercrombie, in making the movement between these two posts. Topographical sketches were made with a pocket compass and estimated distances. Captain Sully determined the source of the Big Sioux river to be in Lake Kampeska. This map and the report are not yet published.

RECONNAISSANCE ON THE MISSOURI AND YELLOWSTONE RIVERS, BY LIEUTENANT G. K. WARREN, TOPOGRAPHICAL ENGINEERS, IN 1856.

A map on a scale of 1 to 600,000 has been prepared and the material reduced from it to the Pacific railroad map. The detailed report and map are not yet published.

On this reconnaissance I was assisted by Mr. N. H. Hutton and Mr. J. H. Snowden, assistant topographers, Dr. and F. V. Hayden, geologist and naturalist, and was provided with an astronomical transit, a sextant, chronometers, barometers, odometers, and compasses. We started on a steamboat from St. Louis, April 16, to join General Harney at Fort Pierre, and on our way made a map of the Missouri from the mouth of the Big Nemeha. At Fort Pierre I received orders from General Harney to proceed on board the American Fur Company's boat St. Mary, and examine the Missouri river as far as she should go, and then to return down the stream by Mackinac boats. The Missouri river was thus mapped as far up as the mouth of the Big Muddy, sixty miles above Fort Union. The party consisted, in addition to the assistants, of about thirty men, seventeen of whom were enlisted men of the 2d infantry. While waiting for the Fur Company at Fort Union to build a Mackinac boat, animals and wagons were purchased, and the whole party explored the left bank of the Yellowstone to the mouth of Powder river. On the return a skin boat was made, and Mr. Hutton sailed down the Yellowstone to its mouth, making a map of the stream. On starting down the Missouri on the 1st of September, the wagons were disposed of, and all the property, stores, and collections placed in the Mackinac boat. The animals were conducted along the river by seven men, and camped every night with the boat. A halt of one day, and sometimes of two, was made at the mouths of streams coming into the Missouri, and at other important localities, where, by means of the animals, careful examinations were made. We arrived at Fort Pierre on the 2d of October, where the expedition terminated.

BRIEF STATEMENT OF THE EXPEDITIONS THAT TOOK THE FIELD IN 1857.

The United States astronomical and surveying parties for establishing the boundary line (49th parallel) between the United States and Great Britain, of which Archibald Campbell, esq., was commissioner, and Lieutenant J. G. Parke, Topographical Engineers, astronomer, was organized under the State Department, and started for the field of operations on the Pacific coast in April, 1857.

The party under Mr. W. H. Nobles, organized in the Interior Department for making a road from Fort Ridgely to the South Pass, examined the route during the summer as far west as the Missouri, at the mouth of Crow creek.

The party under Lieutenant Warren, Topographical Engineers, organized by the War Department, started in June in two divisions—one from Omaha city, the other from Sioux

city. They united at the mouth of Loup Fork, examined this stream to its source, and thence proceeded, by way of the valley of the Niobrara river, to Fort Laramie. Thence they proceeded north, explored the Black Hills, and returning by way of the Niobrara river, examined it to its mouth.

The wagon road expedition organized under the Department of the Interior, of which Mr. F. W. Lander was the engineer, made reconnaissances of the mountains between Green river and Bear river.

The wagon road expedition under Lieutenant Bryan, this year, was confined to routes which he had previously mapped and explored.

The expedition against the Shyenne Indians, commanded by Colonel Sumner, explored a portion of the country between the Platte and Arkansas rivers.

The party commanded by Colonel Johnston to survey the southern boundary of Kansas, and of which Mr. J. H. Clark was astronomer, and Mr. Weiss surveyor, was organized by the War Department. It accomplished that work and reconnoitred the country south of the line.

The party for constructing a wagon road from Fort Defiance to the Colorado river was organized by the War Department, and placed in charge of Mr. E. F. Beale. He examined the line of the proposed road during the summer and winter.

The party for the construction of a wagon road from El Paso to Fort Yuma, of which Mr. ———— was superintendent, and Mr. N. H. Hutton was engineer, passed the summer and winter in the operation, and have not yet returned.

The expedition of Captain Pope, for making of experiments in Artesian well-boring, is still in the field.

A party under Mr. Major, for establishing the portion of the 98th and 100th meridians between the Canadian and Red rivers, was organized by the Interior Department, and is still in the field.

The expedition under Lieutenant Ives for ascertaining the navigability of the Colorado of the Gulf of California, was organized under the War Department, and is still in the field.

The Land Office surveys along the whole frontier are advancing steadily, as in former years.

CHAPTER V.

METHOD OF COMPILING THE MAP, WITH LIST OF PRINCIPAL DETERMINATIONS OF LONGITUDE.

THE compilation of a map exhibiting the present state of our knowledge of the topography and hydrography of the territory of the United States, from the Mississippi river to the Pacific Ocean, is attended with two perplexing difficulties. First, the determination of what is reliable information; and second, the reconcilement of those discrepancies which are found to exist even in maps of reliable explorers. Comparatively few points in this large area have their latitudes and longitudes determined with precision; and the surveys and explorations vary in accuracy, by almost insensible degrees, from the determinations of a boundary line to the crude information of the Indian, or the still more vague representations of the imaginative adventurer.

In some large sections we possess no information, except from uncertain sources. In these parts the rule was adopted to leave the map blank, or to faintly indicate such information as is probably correct.

Where discrepancies are found on comparing the maps of reliable explorations, especially in relation to geographical positions, the principle has been carried out of considering that explorer's map the most accurate whose experience and means of observation were the most perfect. Where these advantages appeared equal, a mean of the results was adopted. In other cases, a less proportionate value was given to the inferior, and in some cases it was even rejected. It is evident that the combination of the materials of different maps in one has necessarily required some distortion of the originals, but, in all cases, much caution was observed to make this distortion as little as possible.

The scale on which the general map was drawn and engraved is that of 1 to 3,000,000, or 47.35 miles to an inch. This is too small to adequately represent the topography and character of the country, except in a very general way; and exacts either a sacrifice of many important details, or a deviation from the adopted scale. Many streams are laid down that would not, in their proper proportions, have a width greater than the 100,000th part of an inch. It is thought, however, that the map will answer the purposes for which it was intended, and its size (4 feet by 3 feet 10 inches) renders it more convenient for reference than if it were drawn upon a larger scale.

The projection of the meridians and parallels of latitude has been made from the tables published in the annual report of Professor A. D. Bache, Superintendent United States Coast Survey, for 1854, and is known as the "Polyconic method." This projection admits of a correct application of the scale of distance to all parts of the map, in directions east and west, and also along the middle meridian. But as we recede from the middle meridian, the length of miles on the scale are somewhat too small. This difference is greatest on the northeast and northwest corners of the map. Thus the length of two degrees on the 124th meridian is about three miles greater than on the 106th or middle meridian. This distortion is, however, so small, that distances are practically correct for all azimuths.

The compilation was begun at the eastern portion—the valley of the Mississippi. Here the surveys of the United States lands furnish a great amount of accurate material, but as they do not generally depend upon astronomical determinations, it is necessary to seek elsewhere for the means of fixing them in correct geographical position. I have, perhaps, attached more than the usual value to these surveys, and feel that it is needful, in order to sustain the accuracy of the compilation, to give my reasons for so doing.*

The first operation of land surveying, according to the principles adopted in the United States General Land Office, is to mark out and carefully measure a principal meridian. A principal base line is then established and measured along a parallel of latitude. Sometimes this line is run first. "Standard parallels are established at stated intervals, to provide for or counteract the error that otherwise would result from the convergency of the meridians." Some of these lines are measured several times; and the numerous checks which the system presents in the subsequent subdivision makes the measurements between any two meridians or parallels very reliable. The error in the difference of longitude between any two points near the same parallel, or in the difference of latitude near the same meridian, as determined by the Land Office plots, will not probably exceed one minute of arc in a distance of 500 miles.† Any slight deviation which may be made in the establishment of the meridian will not materially affect such differences of longitude; but it will affect the relative longitude of points along the meridian. It will be seen hereafter that there is reason to think that errors of deviation from the true meridian have been made in running the land survey meridians.

The first step made in compiling the Land Office maps was to fix upon the geographical positions of the different principal meridians.

The fourth principal meridian runs north from the mouth of the Illinois river through Illinois and Wisconsin, and, according to the land surveys, is about 134 miles east of the mouth of the Minnesota river. This point, as determined by Mr. Colhoun, of Major Long's expedition, in

* Captain Frémont, T. E., in his map of 1843–'44; Major Emory, T. E., in his map of military reconnaissance, in 1846; Captain Stansbury, T. E., in his report of the expedition to the Great Salt Lake, 1849; and Lieut. Bryan, T. E., on his map of route from Fort Leavenworth to the Big Timbers, 1855; all used Mr. Nicollet's determination of the longitude of Fort Leavenworth, though the connexions by Land Office surveys, with the meridian of St. Louis, would have furnished them the result which I have adopted. Lieutenant Beckwith, in his Pacific Railroad Report, vol. ii, 4to edition, page 125, states that the position of Choteau's trading-house on the Kansas river, and of Fort Leavenworth, are takenon his map from Nicollet and Frémont, but this is a mistake, as they are the same as on the general map, that portion of which I had already compiled.

† I have seen considerable errors committed by draughtsmen in not *reducing* the land surveys properly. It is impossible to correctly represent, on the same diagram, by the Land Office method of projecting its plats, the surveys made from two different principal meridians, because *all* the meridians should be made to converge; whereas this method requires the principal meridians to be perpendicular to the parallels, and consequently parallel to each other.

When the plat is made from the surveys, from one principal meridian, the projection known as the Flamsteed can be constructed directly upon it—all that is necessary being to lay off, in the parallels, the lengths of degrees, and to draw the meridians through these points. The meridians will be curved lines, the curvature increasing with the distance from the principal meridian. The map can then be readily reduced to any other projection by the ordinary method of ruling corresponding lines on each projection.

The Flamsteed projection is one of the simplest and best for persons desirous of constructing maps where there are few facilities. All that is necessary is to know the lengths of a degree of the meridian. The lengths of the parallels will be (assuming the earth as a sphere) proportional to the cosines of the latitude. The parallels are all drawn as parallel straight lines, at the distance of a degree or part of a degree from each other. The middle meridian of the map is perpendicular to them. The lengths of degrees, or parts of degrees, are then marked off, from the middle meridian each way, on the parallels. Lines drawn through the points thus fixed give the other meridians, which are all curved lines, crossing the parallels obliquely, the angle decreasing as the distance from the middle meridian is increased. Where the distance from the middle meridian does not exceed 4°, this simple projection will be found sufficiently accurate for nearly all purposes.

1823, and subsequently verified by Mr. Nicollet, (see page 116 of his report,) is about longitude 93° 05′, and is undoubtedly the best determined point, by astronomical observations, on the Upper Mississippi. It would place the fourth principal meridian in longitude 90° 20′, which is the position I have assigned it in the State of Wisconsin. The longitude of St. Louis, quite well established by the observations of Mr. Nicollet, is about 90° 15′ 10″. The fourth meridian is about twelve miles to the westward, making it here in longitude about 90° 30′. If both of these are correct, an error of about one degree deviation to the east was made in running this meridian—an error which I felt obliged to assume in locating it.

The fifth principal meridian passes through the mouth of the Arkansas river, and in Missouri lies about forty miles west of St. Louis. Its longitude, referred to this last point, is therefore about 90° 58′. It was made to conform, in direction, to the sixth principal meridian.

The sixth principal meridian, in Missouri, lies about 114 miles west of St. Louis, making its longitude there 92° 13′. This meridian, in Louisiana, lies about 146 miles west of New Orleans, whose longitude (Nicollect's Report, page 121) is 89° 59′. It is therefore in this latitude, in about longitude 92° 23′. But the longitude of Nut cape, at the mouth of the Sabine, as determined by Major J. D. Graham, Topographical Engineers, is 95° 50′ 15″. This point is about ninety miles west of the sixth principal meridian, which would therefore place the latter in longitude 92° 20′. The difference of longitude of this meridian, as referred to New Orleans and Cape Nut, amounts to 3′, which is probably within the limit of error in these astronomical results. I have therefore given the sixth principal meridian, in Louisiana, the position obtained from a mean of these two references, that is, in longitude 92° 21′ 30″. Here, therefore, with the sixth principal meridian, as with the fourth, we find a difference in the longitude of its northern and southern extremities of 8′ 30″, requiring a deviation from the true meridian of 1° to the east.*

The positions of the fourth and sixth principal meridians having been fixed thus, the surveys made with reference to them established the longitudes approximately of all points of the land office surveys from Lake Superior to the Gulf of Mexico; of the whole western frontier; of the west boundaries of the States; and of the starting points of all the expeditions from that region. Previous astronomical determinations placed these points from 12′ to 15′ too far to the east.

The adoption of the determinations of positions for the mouth of the Minnesota river, for St. Louis, for New Orleans, and for Cape Nut, to the exclusion of all others, was not made without careful investigation and comparisons.

Mr. Warner Lewis, surveyor general of Iowa, furnished me with several measurements along the base lines in that State, and the gentlemen in the General Land Office in Washington afforded me every facility for investigation and comparison.

The longitudes of places thus determined on the general map will, probably, not be found in error by more than 5 of arc.† All astronomical determinations of latitude were used, when carefully made, and they generally agreed with the land surveys. The eastern portion of the

* The commission appointed to run the west boundary of Arkansas south of Fort Smith have found the north end of the land survey meridian inclining to the east, as I had been obliged to represent it on the map.

† A discussion of the difference of longitude, as determined by the land surveys and by the astronomical observations, was made by Mr. Charles Whittlesey and published with the report of Foster and Whitney on the geology of the Lake Superior district.—(Senate Executive Doc. No. 4, special session, March, 1851.) Mr. Whittlesey did not, in this discussion, use the astronomical determination of the mouth of the Minnesota river, which I consider the best one in the region of the Upper Mississippi. Probably the land surveys had not then progressed sufficiently to enable him to compare its results with the other at this point.

map was compiled and engraved in 1854, since which time several good determinations of longitude have been obtained, and compare as follows with those upon this compilation:

Point Seul Choix, 85° 48′, general map; 85° 50′, Captain J. N. Macomb, T. E.*

Chicago, 87° 40, general map; 87° 38′, Major J. D. Graham, T. E.†

Lyons, Illinois, 90° 14′, general map; 90° 14′, Major J. D. Graham, T. E.‡

West Bound. Missouri, 94° 38′, general map; 94° 40′, J. H. Clark.§

The land surveys have been reduced on the bases thus established as far east as the map extends, and as far west as these surveys have been made.

These surveyed lands are bounded on the west by an irregular line extending from the Upper Mississippi, southwest by the St. Peter's river, across the northwest corner of Iowa to the Big Sioux river, and thence south, through the eastern parts of Nebraska and Kansas, (passing near the mouth of Loup Fork and Fort Riley,) and thence along the west boundaries of Missouri, Arkansas, and Louisiana, to the Gulf of Mexico. These surveys, therefore, determine the geographical position of the eastern portion of most of the lines of exploration with much more precision than the few hasty and imperfect astronomical observations which the parties were enabled to make. This method of reducing the land office surveys has also located the Mississippi river with a geographical accuracy probably not before equalled by any map.

The land surveys in Utah furnish us with a map of a considerable area along the western foot of the Wasatch mountains near the Great Salt Lake, their geographical position being determined by the results of Captain Frémont's astronomical observations near the site of Great Salt Lake city in 1845.

The land surveys in New Mexico are as yet confined mainly to the valley of the Rio Grande, but in the latitude of Santa Fé, have been extended east to the sources of the Canadian river. These surveys connect the Mexican boundary surveys with those near the 35th parallel.

The land surveys of California, Oregon, and Washington Territories, also afford much reliable information. The "*San Bernardino meridian*" passes through the summit of the peak of that name, in the southern part of the State of California, and, as referred to the astronomical determinations of the United States Coast Survey, is in about longitude 116° 55′. The *Monte Diabolo meridian* passes through the summit of Monte Diabolo, about twenty-seven miles east of San Francisco, making its longitude, by the Coast Survey determinations, about 123° 53′. Work in the vicinity of this meridian has been extended northward far enough to fix the longitude of Fort Reading at about 122° 11′ 09″. At the time of constructing this portion of the general map, the best determination of this point which we possessed was that of Captain J. C. Frémont, published in his Geographical Memoir of Oregon and Upper California. This places it in longitude 122° 6′ 50″. The determinations of Lieutenants Williamson and Abbot place it in longitude 122° 10′ 50″, closely agreeing with the Land Office work referred to the Coast Survey.

In Oregon and Washington Territories, *the principal meridian* of the Land Office surveys passes through the point of land formed by the junction of the Willamette and Columbia rivers. Its longitude has been determined by measurement between it and several points of the United

* See charts of lake surveys under Topographical Bureau.

† Obtained by magnetic signals between Chicago and Quebec.

‡ Chronometer difference between Lyons and Chicago.—(See proceedings Chicago Historical Society, 1858.)

§ Survey of southern boundary of Kansas in 1858.

States Coast Survey, and is about 122° 47′. The meridian through Mount Pierce has not as yet determined any points of particular value.

The United States Coast Surveys on the shores of the Pacific and Gulf of Mexico, are copied on the general map wherever they have been extended. The work, however, is just beginning—large portions of the coast being only fixed by preliminary reconnaissances—the outlines of the shore on their maps are therefore frequently changed as their surveys progress.

By means of the United States Land Office surveys, and a few carefully determined astronomical positions, the longitude of most of the starting points of the different exploring expeditions on the east, have now been geographically fixed; and by means of the Land Office and Coast Surveys, the termini of many of them on the west. The maps of the surveys of the boundary between Mexico and the United States have been reduced to the general map as received from the office of those surveys; the work forming the southern border of the compilation. From this line I shall proceed north in describing the manner in which the map has been filled in, and in so doing shall take up the different surveys without regard to the date of their prosecution, selecting the most reliable first. In doing this the strict order of relative position must occasionally be abandoned, in order to settle the longitudes of some points common to several explorations.

Texas first claims attention. Colonel Johnston's published map, (Senate Executive Document, No. 64, 1st session 31st Congress,) as well as the manuscript maps of his subsequent explorations, are all made under the supposition that the longitude of San Antonio de Bexar is 98° 40′. But his subsequent observations with a transit gave for this longitude 98° 25′, or 15′ east of that on the map. This would seem to require that the reconnaissances represented on that map should all be moved 15′ towards the east. The surveys of the Mexican boundary, however, show that El Paso and the mouth of Devil's river were only about 10′ too far west on Colonel Johnston's map. I have therefore moved the eastern part of Colonel Johnston's map 15′ to the east, and the western portions but 10′, and reduced the intervening routes of reconnaissance accordingly.* The longitude of Preston then becomes 96° 38′. On Colonel Johnston's map it is 96° 53′; on Captain Marcy's, 96° 20′.

Captain Pope's preliminary map, published with his Pacific Railroad Report, 8vo edition, differs very materially, in some of the positions, from those thus obtained from Colonel Johnston's map, especially along the route of the survey of Lieutenant Michler, T. E.; but, after careful examination, I have adopted Colonel Johnston's work. Captain Pope's railroad reconnaissance route has been reduced conformably to the positions thus obtained. The portions of Texas south and west of Colonel Johnston's map have been reduced from J. De Cordova's map of Texas, dated 1849, which was the last edition available at the time of my compilation.

The map of Lieutenant Parke's exploration for a railroad route between El Paso and the Pimas villages, in 1855,† has been adopted and reduced without change. His survey was very carefully checked by a nearly continuous system of compass triangulations from peak to peak. His line was located by an odometer and compass survey, corrected by astronomical observations, with a sextant for latitude. The geographical positions for El Paso and the Pimas villages were adopted as given by the United States Mexican Boundary Commission.

* The Mexican boundary maps retain the longitude of the lower crossing of the Pecos given on Colonel Johnston's map.

† Lieutenant Parke's surveys on this route, in 1854, as mapped and published in House Document 129, has not been used in our last reduction. Corrected, however, in his position of Dos Cabesas, and with the Rio Arivaypa taken from his last survey, it appeared on the first edition with the preliminary reconnaissances of the first Mexican Boundary Commission. The arrangements made in reducing these maps need not now be discussed, as they have been replaced.

Lieutenant Parke's map of his surveys for a railroad route in California, in 1854–'55, has also been reduced without change on the general map. The following note appears on his map:

"The entire coast line, with the exception of that portion lying between Point San Luis and Santa Barbara, and also the position of Picacho de Gavilan, were obtained from charts of the United States Coast Survey. The eastern limits of the Coast range; the position of the Tulare, Buenavista, and Kern lakes; a portion of the Mohave valley; the Los Angeles and San Bernardino plains; the Santa Ana river; and the foot hills of the Sierra Nevada, were obtained from the surveys of the United States General Land Office. The lower portion of the Mohave valley, and the south end of Soda lake, were taken from the surveys of Lieutenants A. W. Whipple and R. S. Williamson, United States Topographical Engineers."

The portion of the Coast mountains of California lying between the limits of Lieutenant Parke's and the Mexican boundary maps, and the country extending as far east as Soda lake, are reduced partly from the Land Office maps, partly from Lieutenant Williamson's map of surveys in 1853 and 1854, and partly from Lieutenant Whipple's survey of a railroad route near the thirty-fifth parallel. The San Bernardino meridian, placed in longitude 116° 55′ by referring it to the Coast Survey longitude of San Diego and San Pedro, is considered to determine the longitude of other points where the Land Office surveys have been carried with more accuracy than either Lieutenant Whipple's or Lieutenant Williamson's surveys. The longitude of the eastern entrance of the Cajon Pass is thus fixed at 117° 29′; Lieutenant Whipple having it 117° 25′, and Lieutenant Williamson 117° 32′ 40″. Los Angeles is placed in longitude 118° 14′; being on Lieutenant Whipple's map 118° 10′, and on Lieutenant Williamson's 118° 13′ 20″. The maps of Lieutenants Whipple and Williamson have been altered in the reduction to agree with these positions. The mouth of the Mojave cañon, west of Soda lake, is placed by Lieutenant Whipple in longitude 116° 11′ 35″, and by Lieutenant Williamson in longitude 116° 18′. As Lieutenant Whipple had the benefit of Lieutenant Williamson's determination in making his own, and was, moreover, supplied with an astronomical transit, his longitude has been adopted. However, as his longitude of Cajon Pass was 4′ too far east, the same error probably affects his location of the point under consideration, and it would, perhaps, be more accurate to assume a mean position between Lieutenants Williamson and Whipple's for the mouth of the Mojave cañon, viz: 116° 15′. By taking Lieutenant Whipple's determination, I was enabled to reduce his map without change from this point to near its eastern or starting point at Fort Smith.

The longitude of Fort Smith, Arkansas, as determined by the Land Office maps in the manner already stated, is 94° 25′. This result receives confirmation from the determination of the longitude of Fort Gibson, 95° 15′, by Lieutenant Woodruff. For, by the road survey made by R. Richardson in 1826, the difference of longitude between Fort Gibson and Fort Smith is 0° 51′; agreeing almost exactly with these two independent locations. The following positions in longitude have been given Fort Smith on different maps:

	°	′
Major Long's map of explorations to Rocky mountains in 1820	95	05
Lieut. Simpson's survey of Canadian in 1849	94	23
Capt. R. B. Marcy's map of his routes in 1849	94	14
Map compiled in Topographical Bureau in 1850	94	03
Capt. Marcy's map of explorations to sources of Red river in 1852	94	07
Lieut. Whipple's map of survey for Pacific railroad route in 1853 and 1854	94	29
Adopted longitude	94	25

The meridian which passes "100 paces west of Fort Smith" forms the west boundary of Arkansas between the Arkansas and Red rivers. There being 4′ difference in longitude between Lieut. Whipple's position of Fort Smith and the one adopted by me, the discrepancy has been distributed along his route between Fort Smith and the branch of Topofki creek, which is in longitude 96° 57′ 37″, this distance being practically enough to reduce the difference within the limit of error of such reconnaisance. From this branch of Topofki creek to Albuquerque his map is reduced without change. This portion of Lieut. Whipple's map, forming sheet No. 1, as carefully revised by him, does not differ materially in its geographical positions from that published in the House Executive document No. 129, 1st session 33d Congress. The following changes were made by him in the names: Camp No 31, Washita river, to Camp No. 31, Comet creek; Camp No. 32 to Camp No. 32, Silver creek; Camp No. 33, Washita river, to Camp No. 33, Oak creek; Camp No. 42, Antelope creek, to Camp No. 42, White Sandy creek. Lieut. Whipple's longitude of Albuquerque, 106° 37′ 52,″ is 6′ east of Major Emory's position for it.

From Albuquerque west to Soda lake Lieut. Whipple's revision of his work changed the longitudes of nearly all his points, as first published in House document No. 129, 1st session 33d Congress. The first edition of the general map was compiled and engraved from his preliminary map. The second edition contains his work in its revised form. As Lieut. Whipple's longitudes were, in some instances, determined by means of observations with an astronomical transit, his geographical positions were adopted in preference to those of Lieut. Simpson on his expedition to the Navajo country in 1849, or of Captain Sitgreaves in his expedition along the Zuñi and Colorado rivers in 1851. The following is a list of the common points of their routes with the different longitudes:

	Simpson.	Sitgreaves.	Whipple's 1st map.*	Whipple's 2d map.
	° ′ ″	° ′ ″	° ′ ″	° ′ ″
Ojos del Pascado	108 41 45	....	108 19 00	108 14 18
Zuñi	108 56 00	108 56 00	108 32 00	108 42 44
Last Camp on Colorado Chiquito	....	110 53 37	110 50 00	110 53 37
Leroux Spring	....	111 39 32	111 37 00	111 39 32
Cactus Pass	....	113 29 50	113 27 00	113 21 21
Common Point on Colorado, latitude 34° 50′	....	114 40 00	114 30 00	114 29 00
Mouth of Williams' river	....	114 14 00	114 05 00	114 00 00

The latitudes of these different surveys agree almost exactly. The route of Capt. Sitgreaves was compiled both times to fit the longitudes determined by Lieut. Whipple, sometimes requiring elongation and sometimes contraction. Capt. Sitgreaves' route down the Colorado, from Williams' river to Fort Yuma, is made to accord with Lieut. Whipple's determination for the mouth of Williams' river, and that of the United States Mexican Boundary Commission for Fort Yuma. Lieut. Whipple, in revising his sheet No. 2, made the following changes in the names of places:

Camp No. 76, Rio Puerco of the West, to Camp No. 76, near Lithodendron creek.

Camp No. 77, Lithodendron creek, to Camp No. 77, Rio Puerco of the West.

* The first edition of the general map appears with these determinations as a basis for that part of the 35th parallel route.

Camp No. 104, Pueblo creek, to Camp No. 104, Aztec Pass.
Camp No. 105, Pueblo creek, to Camp No. 105, Williams' river.
Camp No. 106, Cañon creek, to Camp No. 106, Williams' river.
Camp No. 107, Cañon creek, to Camp No. 107, Williams' river.
Camp No. 108, Cañon creek, to Camp No. 108, Williams' river.
Camp No. 109, Cañon creek, to Camp No. 109, White Cliff creek.
Camp No. 113, mouth of Cañon creek, to Camp No. 113, Williams' river.
Camp No. 114, Big Sandy creek, to Camp No. 114, Williams' river.
Camp No. 115, Big Sandy creek, to Camp No. 115, Williams' river.
Camp No. 116, Big Sandy creek, to Camp No. 116, Williams' river.
Camp No. 117, Big Sandy creek, to Camp No. 117, Williams' river.
Camp No. 118, Big Sandy creek, to Camp No. 118, Williams' river.
Camp No. 119, Big Sandy creek, to Camp No. 119, Williams' river.
Camp No. 120, Big Sandy creek, to Camp No. 120, Williams' river.
Camp No. 121, Rio Santa Maria, to Camp No. 121, Williams' river.
Camp No. 122, Rio Santa Maria, to Camp No. 122, Williams' river.
Camp No. 123, Rio Santa Maria, to Camp No. 123, Williams' river.
Camp No. 124, Rio Santa Maria, to Camp No. 124, Williams' river.
Camp No. 125, Rio Santa Maria, to Camp No. 125, Williams' river.
Camp No. 126, Rio Santa Maria, to Camp No. 126, Williams' river.

Lieutenant Simpson, in his map of the route of the expedition to the Navajo country in 1849, bases all his astronomical determinations upon the longitude of Santa Fé, determined by Major Emory in 1846, viz: 106° 02′ 30″. In this way he determined the longitude of his station, "two miles northwest from the mouth of the Cañon de Chelly," (his most western station,) to be 109° 42′ 30″; Cañon Cito Bonito, (near Fort Defiance,) to be 109° 15′ 30″; Zuñi to be 108° 56′. According to Lieutenant Whipple, Zuñi is 13′ too far west. Lieutenant Whipple's revised position for Fort Defiance is in longitude 108° 59′, making Lieutenant Simpson's position for it 16′ 30″ too far west; but this determination of Lieutenant Whipple depends upon a side reconnaissance, and cannot be considered as accurate as the main line of his route. I have, however, considered the determinations of Lieutenant Whipple, where they have tested Lieutenant Simpson's work, as sufficient authority for moving the latter's position of the most western part of Cañon de Chelly 13′ to the east, thus placing it in longitude 109° 02′. Lieutenant Simpson's trail was reduced between this assumed position and Santa Fé, adopting Major Emorry's longitude for the latter. The error in position which Lieutenant Simpson's work shows, according to Lieutenant Whipple's, is not greater than is liable to the method employed, viz: chronometric differences by chronometers transported over rough and mountainous country.

Lieutenant Simpson's survey along the Canadian in 1849, agrees with the positions adopted by Lieutenant Whipple.

I have experienced not a little difficulty in bringing in Captain Marcy's map of the expedition to the sources of the Red river in 1852. Astronomical observation with a sextant and watch were occasionally made on this exploration by Captain G. B. McClellan, Corps of Engineers. Captain McClellan has no report thereon in the printed document, and no observations are given, the results being mentioned through the journal or report of Captain Marcy. The latitudes of points, as thus given, differ sometimes considerably from the map,

and I have adopted the latter, thinking it most probable that the discrepancy grew out of error in copying the manuscript or printing the report. I have made out the following list of latitudes and longitudes from the report, though it is not always certain that they are given as the result of astronomical observation.

Place.	Latitude.			Longitude.		
	°	′	″	°	′	″
Mouth of Big Witchita, (on the map 34° 15′)	34	25	51			
Camp on Otter Creek	34	34	16	100	00	45
Camp on North Fork, Red river	35	03	00	100	12	00
Do......do......do	35	15	43			
Do......do......do	35	24	50			
Camp on Sweetwater creek	35	26	13			
Camp on North Fork, near the source	35	35	03	101	55	00
Camp near Red river and Panther pond, (on map 34° 38′)	34	08	30			
Camp on Gypsum creek, (on map 34° 38′)	34	08	11			

The longitude of the camp on Otter creek was found by lunar distances to be 100° 00′ 45″. It is not stated how many observations were taken, but the expedition arrived at the point May 22, and by May 29 the observations had been made and calculated, and Captain McClellan started on this day, traced the 100th meridian south to its intersection with Red river, and marked a cotton-wood tree to indicate the point. The longitude of the mouth of the Little Witchita, 98°, and of Fort Washita, 96° 38′, I have already determined, the difference being 1° 22′. On Captain Marcy's map of 1852, the first is in longitude 98° 30′, (30′ too far west,) and the second is 96° 20′, (18′ too far east,) the difference being 2° 10′. Fort Arbuckle is placed by Captain Marcy in longitude 97° 07′. The position it assumes, by reducing Captain Marcy's trail between the mouth of the Little Witchita and Fort Washita to the general map, is 97° 08′, and this has been adopted. If the longitudes I have adopted for Fort Washita, Fort Arbukle, and the mouth of the Little Witchita are correct, Captain Marcy's map of 1852 contains a relative error between the two last points of 30′ of longitude. Captain Marcy, in his map of 1849, places the mouth of the Little Witchita in longitude 97° 25′, and in the one of 1852 in longitude 98° 30′. When at or near the head of the north fork of Red river, he made an excursion of about thirty miles direct to the Canadian river, striking it at the mouth of *Sandy creek*, where he marked a tree, in longitude 101° 55′, according to his map. Lieutenant Whipple's exploring party, in 1853, did not know of this, and it is not positively certain that the creek, called by Lieutenant Whipple *White Sandy* creek, is that visited by Captain Marcy. If, however, it is the same, its longitude, according to Lieutenant Whipple, is 101° 35′, being 20′ east of the position given it by Captain Marcy. This and other reasons lead me to think that Captain Marcy's map places the eastern front of the Llano Estacado and the sources of the Red river at least 20′ too far west; for, if Captain Marcy's latitudes be assumed correct, as I have done, and his position of the source of the north fork of the Red river be plotted, it falls in the immediate valley of the Canadian, as determined by Lieutenant Whipple, and only about ten miles from the main stream, instead of thirty, which Captain Marcy found to be the case. The only way to preserve this distance between the streams, without changing the latitudes, is to move the positions of Captain

Marcy east to the amount of 20′. This, again, is the only way of making his survey of the North Fork agree with the position determined for it by Lieutenant Abert's survey in 1845, as will be explained further on.

I have therefore moved the sources of Red river 20′ east of Captain Marcy's position, the mouth of the Little Witchita 30′ to the east, and, in order to subject his map to the least distortion which the changes require, the camp at Otter Tail creek 25′ to the east, placing it in longitude 99° 35′. By moving this point with the other parts of the map, I have been enabled to represent the routes of this expedition in nearly the same relative positions as on the original map. The errors I have supposed, for the purpose of representing this information, are within the limits of error of determination of longitude by the means employed.

On Captain Marcy's map of the sources of the Brazos and Big Witchita, made in 1854, Fort Belknap is placed in longitude 98° 47′; the mouth of Panther creek 100°; Large spring, near the Big Wachita, 98° 48′; on the general map these same points are, respectively, 98° 36′, 99° 50′, 99° 35′. These are the only points I can recognize to be nearly common; although the last two are not certain, they go to show that the whole of the positions on the map are from 10′ to 12′ too far west, and that the different parts are relatively correct. As reduced on our map, the routes appear about 11′ east of the geographical positions given on the original.

The survey of the southern boundary of Kansas, by Lieut. Col. J. E. Johnston, in 1857, has been adopted on our map without any change, as it was made by means superior to those possessed by any other surveyor or explorer whose lines are crossed by his.

The survey of the road from Old Fort Osage, through to San Fernando de Taos, in 1825, 1826, and 1827, by J. C. Brown, C. E., has also been adopted as given by him with, the following modifications: This survey was made with chain and compass, corrected by astronomical observations, with a sextant for latitude. The longitudes were fixed by assuming, from the previous determinations of others, that Old Fort Osage was in longitude 93° 51′. According to the position I have assigned Fort Osage, it is in longitnde 94° 14′, requiring an addition of 23′ of longitude to all points of the survey. The point on this route where the southern boundary of Kansas strikes the Cimarron, is determined on our map, by Colonel Johnston's survey, to be in longitude 102° 10′. On Brown's map it is in longitude 101° 52′; showing that his work at this point requires to be moved 18′ west. Brown's survey between this point and Fort Osage is consequently adapted to the general map by shortening it 5′ in longitude. West of this point, on the Cimarron, Brown's map is nearly copied, all points being moved 18′ westward. Taos thus comes to be located in longitude 105° 30′, which is nearly 10′ east of its position on Major Emory's map.

Major Emory's determination of the longitude of Santa Fé (106° 04′ by lunar distances, see page 266 of his report of Mil. Recon.) is given on his map at 106° 02′. The Land Office connexions with the Mexican boundary survey and Lieut. Whipple's determinations of Albuquerque agree; and applying this same connexion to Sant Fé, its longitude would be about 106° 02′, agreeing with Major Emory's map. This longitude has been adopted. The position of Albuquerque and Isletta having been moved 6′ to the east of Major Emory's position, the portion of his map between these points and Santa Fé was shortened in longitude to this amount. The

° In the summer following the date of this Memoir, the observations for the determination of the position of the 100th meridian have shown even a greater error in regard to Marcy's longitude of the mouth of Otter creek.

longitude of the Copper Mines, as given on the Mexican boundary map, is 108° 06′; on Major Emory's reconnaissance map it is 108° 12′. This position has therefore been moved to the east just the amount which Lieut. Whipple moved Albuquerque. Major Emory's reconnaissance in 1846 has therefore been moved entire between these points 6′ to the east, and thus reduced to the general map. West of Mount Graham the Gila river has been taken from the maps of the surveys under the Boundary Commission.

Major Emory's route in 1846, from the place where he struck the Santa Fé trail to Choteau's island on the Arkansas, is nearly that of the road surveyed by Mr. Brown in 1825–'26–'27. The longitude and latitude of the mouth of Walnut creek and of Choteau's island, and the survey of the river between them, being almost precisely the same. This position of Choteau's island on our map, as obtained from Brown's survey in the manner explained, is about 19′ further west than that given by him, and 19′ further west than that given by Major Emory. In Major Emory's report, (page 223,) his determination of longitude of Bent's Old Fort, by seven observation of the distance of Aquilæ from the moon, is 102° 27′ 19.9″, and by four observations for the distance of Spica, 103° 26′ 02″; mean of all, 102° 56′ 40″. In the list of geographical positions given, (page 176 of his report,) this longitude is given 103° 01′, and it is so represented on the map. On Captain Frémont's map of routes in 1842–'43–'44, the longitude of Bent's Old Fort is given at 103° 45′, and the difference between it and the mouth of Fontaine qui Bouit creek, 1° 15′. This last point, as determined by Captain Frémont in 1845, is in longitude 104° 42′; subtracting this difference from it, places Bent's Old Fort in longitude 103° 27′, (in the table of positions in his memoir it is given as 103° 33′ 20″.) As this difference of longitude between the fort and the mouth of the Fontaine qui Bouit creek, a distance of about eighty miles, depends upon the topographical reconnaissance with estimated distances, it cannot be considered very exact, still its near coincidence to Major Emory's determination by the moon's distance from Spica renders its correctness more probable. Taking now the map of Captain Gunnison's route up the Arkansas, as prepared by Mr. Egloffstein, we find he places Choteau island in 101° 21′, being nearly the same as that on the general map, (101° 20′,) as obtained from Brown's survey. Captain Gunnison's map places the longitude of Bent's Old Fort in longitude 103° 24′ 30″; and as the adoption of this saved any change in embodying this map, and does not differ materially from my deduction from Capt. Frémont and Major Emory's work, I have done so.

In reducing Major Emory's reconnoissance from Bent's Fort to Santa Fé, it would seem that as the position of the fort has been moved west, while that of Santa Fé has remained the same, the position of the Raton Pass should also be moved to the west. I have, however, retained it as given by him: First, because the Spanish peaks, which must have been fixed in position by bearings along his route, were placed further *east* by Captain Gunnison than by Major Emory; and, second, because, by taking the position of the crossing of the Canadian as fixed by Brown's survey, and connecting the Pass with it by Lieutenant Abert and Peck's reconnaissance, it would also be necessary to move it to the *east*. Major Emory's position for the Raton Pass has therefore been retained as being a mean of all the other requirements. Lieutenants Peck's reconnaissance of the Cimarron route, as given on Major Emory's map, makes the position of the "Point of Rocks" somewhat east of that obtained from Brown's survey, which it has been made to conform with.

In reducing Lieutenant Abert and Peck's reconnaissance of the Canadian in 1845, the trail between the Raton Pass and the Cimarron crossing of the Canadian, is made to correspond

with the position of those points as already adopted, and this moves his position for the latter point 14′ to the east. His position for his camp of September 9, 1845, on the Canadian, is the same as on Lieutenant Whipple's map. His route in reducing had thus to be shortened 14′ in longitude between that point and the Cimarron crossing of the Canadian.

Lieutenant Abert's longitude of the point where he left the Canadian (as nearly as I can recognise it on Whipple's map) seems to correspond, in position, with Lieutenant Whipple's, as does also the crossing of the north fork of the Washita. They have therefore been adopted. Lieutenant Abert's positions are retained as far east as Old Fort Edwards, at the mouth of Little river.

Lieutenant Abert's map of explorations in New Mexico, in 1846, has been reduced to the general map, by making the points of his trail correspond, in position, with those of the other explorers, reduced, as already stated, wherever they intersect.

In Mr. R. H. Kern's reconnaissance of the Pecos he assumed the longitude of Anton Chico to be 105° 25′. According to Lieutenant Whipple it is 105° 09′, being 16′ to the east of Mr. Kern's position, whose work has therefore been moved 16′ to the east for that portion of the Pecos below Anton Chico.

The boundary of the country lying between the upper part of the Pecos and the Rio Grande having now been determined, the map of Lieutenant I. N. Moore was used to fill in the intervening space, his positions being made to conform to those previously adopted.

The map of the survey of the boundary of the Creek country by Sitgreaves and Woodruff, and of the north fork of the Canadian, &c., has been reduced to the general map without any change.

Major Long's map of his expedition to the Rocky mountains has been used for his route between the Arkansas and Canadian rivers. The point where he left the Arkansas I believe to be about halfway between the mouths of the Apishpa and Timpas creeks, in longitude 103° 27′, by the general map; on his map it is in longitude 103° 46′. We have therefore moved his trail between this point and the Canadian 19′ to the east, which makes the mouth of the branch of the Canadian down which he travelled correspond to the mouth of one represented on Lieutenant Abert's map. The route of Major Bell (who conducted the detachment of Major Long's expedition along the Arkansas) is used to put in that stream between Walnut creek and Fort Gibson.

The map of the reconnaissance of Captain Boone between the Arkansas and Canadian rivers has been reduced to correspond with the positions already determined wherever they are common to his routes.

The reconnaissance of Lieutenant Amory between Fort Gibson and the Santa Fé road to Independence, of Major Merrill between Fort Belknap and Council Grove, and of Captain Pope from the Cimarron to the Arkansas, have been reduced to our map, by making the points common to the explorations previously reduced to conform therewith.

As before stated, the longitudes of all points along the west boundary of Missouri are determined by reference to the land surveys, the longitude of them being determined by that of St. Louis. The longitude of Westport, the starting point of Captain Frémont's first two expeditions, is thus determined to be 94° 37′, instead of 94° 22′, as adopted by him; that of Fort Leavenworth to be 94° 58′, instead of 94° 44′, as determined by Mr. Nicollect, and adopted by Major Emory and Captain Stansbury. Captain Frémont, in a note preceding the list of astronomical positions in his report of his second expedition, (page 321,) says: "The course of the ensuing expedition will intersect the line established by our previous operations at various

points, which it is proposed to correct, in longitude, by lunar culminations, and such absolute observations as may be conveniently obtained. Such a position at the mouth of Fontaine qui Bouit, on the Arkansas river, will be a good point of reference for the longitudes along the foot of the mountains. In passing by the Utah to the southern portion of the Great Salt lake, we shall have an opportunity to verify our longitudes in that quarter; and as, in the course of our exploration, we shall touch upon several points previously determined along the western limit of our recent journey, we shall probably be able to form a reasonably correct frame on which to base the construction of a general map of the country."

In Captain Frémont's memoir and map on Oregon and Lower California will be found the astronomical results of this expedition from the mouth of Fontaine qui Bouit creek westward. No topographical explorer has since visited points along his routes with means capable of detecting any errors in his determinations, and they have been generally adopted. The mouth of Fontaine qui Bouit creek was placed on the first map in longitude 105°; on the second, according to moon culminations, in 104° 42′ 41″. The longitude determined at Great Salt lake, and at Lassen's farm on Deer creek, California, by moon culminations, confirmed his first determinations of positions in these regions as given on his previous map. The position for Lassen's is only about 5′ too far east, as since determined. The correction which Captain Frémont found at Fontaine qui Bouit, viz: 17′ east, if used to correct the "longitudes along the foot of the mountains, as given on the map of explorations in 1842–'43–'44, would place St. Vrain's Fort in longitude 104° 55′, and Fort Laramie in longitude 104° 30′, and this last agrees nearly with that adopted on Stansbury's map." (See note of Lieutenant Gunnison, page 302, Stansbury's Report.) But Mr. Preuss, in constructing the map of 1848, puts Fort Laramie still further east, viz: in longitude 104° 25′, and St. Vrain's Fort in longitude 104° 47′, moving these points further east, it seems to me, than the correction obtained at the mouth of Fontaine qui Bouit creek demanded. I have taken Fort Laramie in longitude 104° 30′,* and St. Vrain's Fort in longitude 104° 55′. Captain Frémont's route, in 1843, from St. Vrain's Fort west to his station of September 13, on Bear river, had to be elongated from what it is represented on the map of 1844, and shortened from what it is on the one of 1848. I retained the position of the crossing of the north of the Platte (longitude 107° 10′) as given on the map of 1848, Lieutenant Gunnison having adopted it in constructing Stansbury's map. This is nearly the position it would have by distributing the correction which I have applied to St. Vrain's Fort between that point and Frémont's station of September 13, 1843. This station of September 13, depends for its longitude on an occultation of τ Arietes, and to it all the points of the route along Snake river, and the Columbia as far as the Dalles, are referred by chronometric differences. Captain Frémont's routes south of Lieutenant Beckwith's trail, in Utah, have all been reduced to our map as given on his map of 1848, his position for the point where the Santa Fé trail leaves the Mojave agreeing with the best recent determinations. In putting down Captain Frémont's route from Bent's Old Fort east along the Smoky Hill Fork of the Kansas, as given on his map of routes in 1842, 1843, and 1844, I have moved his position of Bent's Old Fort from 103° 45′ to 103° 24′ 30″, and of the point where he struck the Santa Fé road from 96° 58′ to 97° 12′, thus shortening this portion of his route by 34′ in longitude. St. Vrain's Fort having been moved 17′ east, and the mouth of the Republican Fork 14′ west, (Fort Riley from 96° 30′ to 96° 44′,) the intervening portion of his route, *via* the Republican Fork, was 31′ shorter in longitude than represented on his map of routes 1843–'44.

* Eight nights' observations made by me in 1857 with a 26-inch transit, on moon culminations, gave for the result 104° 30′ 36″.

The Kansas river, as far west as Fort Riley, has been reduced from the Land Office surveys. Captain Gunnison's survey for a railroad route has, therefore, not been used east of that point. His map, as constructed by Mr. Egloffstein, places Fort Riley in longitude 96° 50′, being 6′ too far west, and of the mouth of Walnut creek 98° 49′, instead of 98° 42′. The work between these two points has been moved 6′ to the west. From Walnut creek to Choteau island Brown's survey was used in the compilation, and from that point (which coincides in position with that from Captain Gunnison's survey) westward, the maps prepared by Mr. Egloffstein from Captains Gunnison and Beckwith's surveys, have been exactly copied, except for the position of Fort Reading, which was assumed by Mr. Egloffstein as 1′ 42″ eastward of Colonel Frémont's location, or about 6′ too far east. This error in Captain Beckwith's map was distributed through his work in the Sierra Nevada.

Captain Stansbury's routes have all been copied on our map nearly as given by him west of the meridian of Fort Laramie, subject only to such slight changes as Captain Beckwith's and Lieutenant Bryan's surveys showed to be necessary. He, however, adopted from Mr. Nicollet the longitude of Fort Leavenworth, (94° 45′,) instead of 94° 58′, which required his route to be shortened 13′ between this fort and Fort Laramie. Fort Kearny had thus to be moved 8′ west of its position on Captain Stansbury's map, that is, from 98° 58′ to 99° 06′. The chain and compass survey made between Fort Kearny and Omaha by Captain Dickerson, in 1856, showed the difference of longitude between them to be very nearly the same as I had adopted, the longitude of Omaha being determined by the Land Office surveys, as before explained.* Lieutenant Bryan, on his map of explorations to Bridger's Pass, adopted the position of Fort Kearny as given by Captain Stansbury, although he changed Fort Leavenworth, upon which Captain Stansbury's determination depended by his compass survey, no astronomical observations having been made for its longitude. The longitude of the mouth of the Platte being determined from the Land Office surveys, this stream has been laid down from Colonel Frémont's and Captain Stansbury's maps to conform to the longitudes of the points I have enumerated.

The mouth of the Big Sioux, according to the Land Office surveys, referred to the meridians determined as already described, is about 12′ west of what it is as given by Mr. Nicollet. The position of Lake Jessie, according to Governor Stevens' map, is also 12′ west of Mr. Nicollet's determination; and as Mr. Nicollet's work is uniformly from 12′ to 15′ too far east along the Missouri wherever checked, I have thought it best to move it entire from the mouth of the Big Sioux to Fort Pierre, and thence to Devil's lake, 12′ to the west; Fort Pierre then becomes in longitude 100° 24½′, instead of 100° 12½′.

The longitude of the mouth of the St. Peter's river having been adopted from Mr. Nicollet, and the route to Devil's lake having been moved 12′ west, Mr. Nicollet's routes between the meridians through these points have so been put down as to proportion this difference throughout.

In my map of "Reconnaissance in the Dacota country," I assumed the positions adopted on the general map. In my explorations on the Missouri and Yellowstone, in 1856, I determined the longitude of Fort Union, by two sets of moon culminating stars, to be 104° 02′ 07″, corresponding nearly with that adopted by Governor Stevens. The Missouri river has been put

* The difference of longitude between Fort Kearny and Nebraska city, by the Land Office surveys made in 1858, confirms the position I have adopted.

in from my map from the mouth of the Big Muddy to the Big Nemeha.* Below that it is taken from the Land Office surveys. From the Big Muddy to Fort Benton it is from reconnaissances made under Governor Stevens.

On Governor Stevens' explorations in 1853, no observations were made for longitude. The route was determined by compass courses and odometer distances, checked by observations for latitude between the mouth of the St. Peter's river and Fort Walla-Walla. The longitude of Fort Walla-Walla, according to Colonel Frémont, is 118° 32′, but he made no astronomical observations at this point. According to Captain Wilkes it is 118° 47′ 45″. The means by which this was obtained will be found in the following letter, which Captain Wilkes was kind enough to send me in answer to certain inquiries. His determination, as given in his letter to me, was adopted.

WASHINGTON CITY, *July* 5, 1854.

DEAR SIR: Your letter of June 29 would have been answered sooner if I could have found the observation by which the position of Walla-Walla was determined.

The position I assign to it is, latitude 46° 02′ 48″ north; longitude 118° 47′ 45″ west. The result of three days' observation deduced from chronometer; these were made by Lieutenant Johnson, of the expedition, who had charge of the party, and were calculated out under my own examination of the notes. The position was also determined by bearing or angles on three mountain peaks,† which gave a very near accordance in the result. I have always felt great confidence in the result. I gave them at the time a very careful examination, and think Lieutenant Johnson made them under favorable circumstances. Mr. Drayton, who also visited Walla-Walla on the survey of the river up to that point, agrees in his determination with Lieutenant Johnson at this point; their observations were intended to serve as checks upon each other.

I am, very respectfully, your obedient servant,

CHARLES WILKES.

Lieutenant G. K. WARREN,
Topographical Engineers, Washington.

The determination of Captain Wilkes was also adopted by Mr. Lambert, (Governor Stevens' topographer,) who constructed his map in this office. He says of the route of the main line of Governor Stevens' survey, in his report on topography, (Pacific Railroad Surveys, quarto edition, 1st volume, page 176, Governor Steven's Report): "It is satisfactory to know that the survey, as it was first plotted, independent of correction by astronomical points, but connected by those of Captain Wilkes and Professor Nicollet, was only ten miles in error, being in excess." As far west as Walla-Walla, Governor Stevens' route, as mapped, is, therefore, copied on the general map; but west of this, along the Columbia, it has been subjected to some modifications by the Land Office surveys and the reconnaissance by Lieutenants Williamson and Abbot, in 1855.

The Yellowstone river, as far up as the mouth of Powder river, was taken from my reconnaissance in 1856. Powder river is the same as the Warharsa on Lewis and Clarke's map. Any one will, I think, be convinced, who examines the maps and reads Lieutenant Mullan's

* My transit observations at Fort Randall in 1857, show the position of the fort, as thus laid down, (longitude 98° 36′,) to be nearly correct.

† This required Captain Frémont's reconnaissance along Snake river to be elongated to the amount of 16′ between Fort Walla-Walla and Fort Hall.

description of the Muscle Shell river in Governor Stevens' report, and Captain Clarke's description of the Yellowstone in Chapter 33 of "Lewis and Clarke's Travels," that they are the same river, and also that the branch up which Lieutenant Mullan travelled when he left the Yellowstone, is the one Captain Clarke calls Shield's river. I have so taken them.* The route of Captain Clarke from the source of the Jefferson Fork of the Missouri to the Yellowstone and down the latter, has been put in so as to conform to the points of his route determined by Lieutenant Mullan's and my own reconnaissances.

The survey of Captain Reno, from Big Sioux river to Mendota, was reduced so as to conform to the Land Office work. The reconnaissance of Captain Sully, in 1855, from Fort Ridgely to Fort Pierre, was made to conform to the positions obtained from Mr. Nicollet.

Captain Pope adopted Major Long's position of the Pembina settlement on the Red River of the North, but he moved the position of the junction of the Red river and the Bois des Sioux about 12′ to the east of it. Governor Stevens and Captain Simpson's surveys indicate that Captain Pope's work, between the Red river and the Mississippi, is crowded by at least 12′ more than it should be. I have therefore retained Major Long's position of Red river and of his route to Lake Winnepeg, and thence to Lake Superior. Captain Pope's map was reduced so as to make his route agree in longitude with that of Major Long wherever they crossed.† From Mr. Nicollet's map has been taken the sources of the Mississippi, and the lakes, &c., between it and the Crow Wing river; which latter was taken from Captain Simpson's survey. The position of many of the lakes given by Mr. Nicollet in this neighborhood must have been derived in some uncertain way from the Indians, as many of them cannot now be recognized. The attempt has been made to retain for these lakes the names of the eminent scientific men with which he adorned the map of this region; but it is probable that, as the country becomes inhabited by white men, these names will have to be replaced on our maps by the more common ones of the country. Mr. Nicollet's map (I know not on what grounds) put Red lake considerably to the west of the position given it by Major Long; but the latter I have adopted, as recent examinations show it to be more probably correct.

The boundary between the United States and British Possession has been taken from the maps of the surveys of the Northwestern Boundary Commission, from Lake Superior to Rainy lake.

Lieutenant Abbot's Pacific railroad maps of Oregon and Northern California I have adopted exactly as prepared by him.

Fort Vancouver was placed by Wilkes in longitude 123° 19½′; and this was adopted by Capt. Frémont on his map of 1848. In Frémont's map of 1842–'43 and '44, the longitude of this point is taken at 122° 41½′. Captain McClellan adopted 122° 19½′ on his map of explorations in the Cascade mountains. Mr. Lambert, on making Governor Stevens' map, took it 122° 40′. But the Land Office surveys, in connexion with the Coast Survey, show the longitude of Fort Vancouver to be 122° 32½′, which we have adopted. This position is near a mean between that first given it by Captain Frémont and that by Captain Wilkes. Lieutenant Abbot's position for the Dalles is 120° 58′. Governor Stevens' map has it 120° 53′, which is the same as on Wilkes' and Frémont's maps. Lieutenant Abbot places the Cascades in about longitude 121° 42′; Frémont, 121° 36′; Wilkes, 121° 57′; which last was adopted by McClellan and

* See foot note to page 68 of this Report for a discussion of this subject.

† This portion of the map, as first reduced and engraved, is erroneous in moving the whole of Red river to the west 12′ to accord with Governor Stevens' work. This would have been accomplished by adopting Major Long's work as above.

Stevens. Lieutenant Abbot's observations place Mount Adams in latitude 46° 12′, longitude 121° 19′, (being 2′ south and 15′ west of its position on Captain McClellan's map;) Mount St. Helen's in latitude 46° 11½′, and longitude 122° 5′, (being 10′ south and 4′ west of Captain McClellan's determination.) Both Wilkes and Frémont confounded these peaks. A note on Lieutenant Abbot's Oregon map shows that, by his compass bearings, Captain McClellan placed Mount Rainier about 15′ too far east, Capt. M. placing it in longitude 121° 25′, and Nachess Pass in longitude 121° 25′.

Lieutenant Arnold's survey, in 1854, through the Nachess Pass, after correcting his longitude of Walla-Walla, (which he took at 118° 55′, or 8′ too far west,) places the summit of the Nachess Pass in longitude 121° 09′; Mount Rainier he puts in longitude 121° 25′, probably taking it from Captain McClellan. Lieutenant Arnold's position of the Nachess Pass is some 6′ north of that on Captain McClellan's map, and differs also in being 16′ in longitude to the east. To represent Lieutenant Arnold's survey would require much of Captain McClellan's work to be changed; but as the latter had already been engraved before the former was received, it was not possible to make the change for the first edition of the general map. The additional examinations now being made in this neighborhood will require much of the Cascade range of mountains in Washington Territory to be re-engraved.

The numerous small reconnaissances not mentioned in this explanation of the manner of compiling the general map, have all been reduced to it according to the geographical positions determined by the other reconnaissances and surveys, the compilation of which I have discussed.

I conclude this chapter by giving a list of the principal points of the compilations, with their longitudes, according to the best determinations and comparisons.

List of principal positions used in compiling the map and their adopted longitudes.

Place.	Longitude. °	′	″	Authority.
Point Seul-choix, Lake Michigan	85	50		Captain J. N. Macomb, T. E.
Mouth of Mississippi river, (pilot-house)	89	04		Captain A. Talcott, Eng.
New Orleans Cathedral	89	59		Nicollet, (see Report.)
St. Louis Cathedral	90	15	10	Nicollet.
Fourth Principal Meridian, in Wisconsin	90	20		
Fourth Principal Meridian, mouth of Illinois river	90	30		
Fifth Principal Meridian, in Missouri	90	58		
Sixth Principal Meridian, in latitude 36° 30′	92	13		
Sixth Principal Meridian, in latitude of New Orleans	92	21	30	
Mouth of St. Peter's river	93	05		Major Long and Mr. Nicollet.
Cape Nut, mouth of Sabine river	93	50	15	Major J. D. Graham, T. E.
Fort Smith, Arkansas	94	25		
Fort Leavenworth	94	58		
Fort Gibson	95	15		Lieutenant I. C. Woodruff, T. E.
Council Grove	96	28		
Mouth of Big Sioux river	96	30		
Preston	96	38		
Fort Riley	96	44		
Pembina	97	03		
Fort Arbuckle	97	10		
San Antonio	98	25		Colonel J. E. Johnston, T. E.
Fort Belknap	98	37		
Fort Kearny	99	06		
Choteau island, Arkansas river	101	20		
Fort Pierre	100	24	30	
Bent's New Fort, (Big Timbers, Arkansas river)	102	37		
Bent's Old Fort	103	17		
Mouth Delaware creek	103	52		Captain J. Pope, T. E.*
Fort Union, Missouri river	104	02	07	Lieutenant G. K. Warren, T. E.
Fort Laramie	104	30		
Mouth of Fontaine qui Bouit creek	104	42	41	Captain J. C. Frémont, T. E.
St. Vrain's Fort	104	55		
Santa Fé	106	02		Major W. H. Emory, T. E.
El Paso	106	29		Mexican Boundary Commission.
Albuquerque	106	37	52	Lieutenant A. W. Whipple, T. E.
Copper Mines	108	06		Mexican Boundary Commission.
Camp near mouth of Bear river	112	05	12	Captain J. C. Frémont, T. E.
Camp near Great Salt lake	112	06	08	Captain J. C. Frémont, T. E.
San Bernardino meridian	116	55		
San Pedro	118	16	03	Coast Survey.
Fort Walla-Walla	118	47	45	Commander Wilkes, U. S. N.
Dalles of the Columbia	120	58		Lieutenant H. L. Abbot, T. E.
Fort Reading	122	11		
Fort Vancouver	122	32	30	
Willamette meridian	122	47		
Monte Diablo meridian	123	53		

* A more recent determination of Captain Pope makes it 104° 03′ 56″.

CHAPTER VI.

GENERAL REMARKS ON THE TOPOGRAPHY OF THE MOUNTAIN REGION WEST OF THE MISSISSIPPI.

THE mountains in our territory west of the Mississippi river, from where they rise above the horizontal strata of recent geological formations on the east to their disappearance under the waters of the Pacific Ocean, form a nearly continuous mass of upheaved ridges, with occasional intervening level plateaus. The direction of the central line of this mass between the 32d and 49th parallels of north latitude, is about north 20° west. The greatest width perpendicular to this direction is along the line passing from the vicinity of San Francisco through that of the Great Salt Lake to Fort Laramie. This distance is about 1,000 miles, or, if we include the Black Hills of Nebraska, 1,125 miles.

The great mountain mass, of which that in our territory forms but a part, extends with varying breadth nearly on the line of a great circle of the globe from Cape Horn north to Behring Straits, and thence south along the western part of Asia to the island of Sumatra. Its length is about 240 degrees, or 18,560 miles, being two-thirds of the circumference of the earth.

The area occupied by and included in this mountain mass in our territory, is about 980,000 square miles. Large as this is, it is probably only a small portion of the upheaved formations between the 32d and 49th parallels. A few ridges and peaks projecting above the surface of the Pacific as islands, or above the level tertiary and cretaceous strata of the eastern plains, give evidence of the existence of vast areas whose extent must forever remain unknown. Throughout the portions now visible, proofs are abundant of great abrasions; in some cases whole ridges even, having been swept away or broken into separate portions.

Already enough has been learned to establish the existence in these mountains of the equivalents of many of the geological formations; and it is probable, when investigations have been carried to the same extent as in the civilized portions of the earth, that the geologist will find here new and still more complex fields for research.

The classification of the separate parts of this mountain mass, so as to present its physical characteristics clearly to the mind, is a great desideratum. It has in part been attempted at various times, but as yet unsuccessfully from the want of sufficient information; the theorist's idea being often proved to be wrong by new discoveries almost as soon as uttered.

In this immense field, many years of patient labor are yet necessary before any general classification of these mountains on geological principles can be made, even if it ever be in the power of human research and understanding. The practical wants of the geographer, of the meteorologist, and of the engineer, will not permit of this delay; and numerous general descriptions and theories to supply the want of facts have been attempted by them for the purpose of more clearly explaining their views. In this way mountain ridges have sometimes been improvised for the occasion, and the want of facts supplied by "generalizations and ideal

connexions." Confusion and error have thus resulted, rendering much study necessary to separate the ascertained from the assumed.

To free the general map as much as possible from this objection, I have, according to my instructions, represented on it only such mountains as are known. In some instances where the exploration of known ranges was imperfect, they have been but faintly engraved, and the word "unexplored" placed near them. This is the case with the Big Horn mountains, the Sierra la Plata, and the Blue mountains. In other places, where no explanations have been made, spaces are left blank, as in the southern portion of the Great Basin. A serious difficulty is experienced in giving a correct graphic representation of level regions furrowed by the chasms of large rivers, like the Colorado, because these depressions have, except upon close scrutiny, nearly the same effect to the eye as mountain ridges.

The collection of ascertained facts represented on this map far exceeds that of any former one of this region. I shall not attempt any description or enumeration of the different parts, the map itself being an exhibition, perhaps more full and intelligible than any that could be put in words. To prevent the map from exhibiting any bias which my own views may have taken, I have copied as nearly as possible the styles of different topographers on the original maps, and thus some parts may have peculiarities which belong more to the delineator than to the country itself.

The publication of the Pacific Railroad maps will probably change some of the former ideas of these mountains, and give rise to new speculations as to their directions, equivalents, and connexions of different parts. Every one knows how easy it is to generalize ideas where facts are few, and in accordance with this, those who have travelled most in the region have theorized the least, having seen the immensity of the subject and the difficulties which must be overcome to comprehend it. Those who have investigated merely the travels of others, have had only the imperfect representations of the latter on which to theorize.

It may not be inappropriate here to give some of the general ideas which have successively prevailed in regard to these mountains.

In the earlier periods of North American discovery it was known that there were mountains in the interior at its northern and southern parts, and rivers flowing from them to the two great oceans east and west. It was natural to connect these mountains by hypothesis, and to consider them as one great chain, separating the sources of these streams. Such an idea prevailed at the time of Humboldt's New Spain. Even now many well informed persons consider that a road has but one mountain summit to cross from the Mississippi river to the Pacific Ocean.

When, after the publication of the charts of Vancouver, map makers became aware of the extent of the mountains near the Pacific coast, nothing seemed more natural than to suppose two great mountain chains—one near the Pacific and one in the interior. If this theory were true, we should find a great longitudinal valley between the ranges similar to that separating the interior mountains from the Alleghanies, and we should have but two mountain summits to pass between the Mississippi and the Pacific. This idea is practically as erroneous as that of one summit, although it still prevails. Such a prominent place did this longitudinal valley hold, in the opinions of geographers of earlier times, that we find in Humboldt's New Spain: "M. Malte Brun has started important doubts concerning the identity of the Tacouche Tesse and the river Columbia. He even presumes that the former discharges itself into the Gulf of California: a bold supposition, which would give the Tacouche Tesse a course of an enormous

length. It must be allowed that all that part of the west of North America is still but very imperfectly known.''

The explorations of Lewis and Clarke proved that the Tacouche Teche did not empty into the Gulf of California, and that it was probably the source of the Columbia. Without considering the character of the pass of the Columbia river through the Cascade range, the belief now became general that the overland route in this latitude crossed but one summit, and was therefore more favorable than any other. This erroneous idea, with some, still prevails.

The idea of rivers traversing great mountain chains, now known to be so common in the mountains west of the Mississippi, was so repugnant to the opinions of even philosophers in earlier times, that we find Humboldt saying, ''every geographer who carefully compares Mackenzie's map with Vancouver's will be *astonished* that the Columbia, in descending from the Stony mountains, which we cannot help considering as a prolongation of the Andes of Mexico, should traverse the chains of mountains which approach the shore of the great ocean, whose principal summits are Mount St. Helen and Mount Rainier.''

In reference to the supplying a want of facts by theories, Humboldt makes the following remarks : ''It is a false application of the principles of hydrography when geographers attempt to determine the chains of mountains in countries of which they suppose they know the course of rivers. They suppose that two great basins of water can only be separated by great elevations, or that a considerable river can only change its direction where a group of mountains opposes its course ; they forget that frequently, either on account of the nature of the rocks, or on account of the inclination of the strata, the most elevated levels give rise to no river, while the sources of the most considerable rivers are distant from the high chains of mountains. Hence the attempts which have been hitherto made to construct maps from theoretical ideas have never been very successful. For the true configuration of the earth is so much the more difficult to be discovered, as the pelagic currents, and the greater number of the rivers, which have changed the surface of the globe, have totally disappeared. The most perfect acquaintance with those which have existed, and those which actually exist in our day, might instruct us as to the slope of the valleys, but by no means as to the absolute height of the mountains, or the position of their chains.''

The distinguished explorers, Lewis and Clarke, having determined that the Columbia river broke through the Cascade range, considered, from the size of the Willamette at its mouth, that it also broke through this chain, having its source in the Rocky mountains, near the position of Great Salt lake. We then see the American maps representing mountains surrounding the valleys of the Columbia and Colorado, and separating them from that of the San Joaquin and Sacramento. On the English maps of that date, the Sierra Nevada is not represented, and two or three great rivers are made to flow from large lakes in the interior to the Pacific; nearly all of their compilers making false applications of the principles of hydrography laid down by Humboldt.

The first map which represented these rivers and lakes correctly was that of Captain Bonneville, of which I have given a reduced copy. There we see the Great Salt lake and Bear river and Utah lake forming one basin; to the west lies the Mary or Ogden's river, with its lakes forming another enclosed basin; the San Joaquin and Sacramento rivers in their right position; and the Willamette reduced to its proper length. The positions given on this map are not geographically correct, nor are their many mountains indicated ; but it gives the first

correct idea of the hydrographic character of the country; and by giving too little rather than too much, escapes the errors into which others had fallen.

The explorations of Captain Frémont fixed these great rivers and basins in their proper geographical positions; but his maps have given rise to many erroneous impressions in regard to the mountain ranges. Still, making a "false application of the principles of hydrography," he represented all the basins as if surrounded with mountains or "rims," and thus introduced mountain chains which have no existence in nature.

Since Frémont's expedition began, a large portion of the area of these mountains in the territory of the United States has been examined, and many new attempts have been made to systematize the knowledge acquired. The most important theory advanced is that of parallelism in the ranges, the foundation of which I shall briefly indicate.

On the map of Lewis and Clarke the Rocky mountain ranges are represented parallel to each other with a northwest trend. That this was their theory is evident, from the fact that they indicated the Black Hills about the source of the Shyenne as having this same trend, though they never saw them, and only knew of their existence from hearsay.

The maps of Captain Frémont showed a parallelism and general north and south direction of the mountain ranges from the Wasatch, east of the Salt Lake, to the Sierra Nevada, including all the numerous intermediate ranges.

The maps made by Major Emory, near the 32d parallel, and in New Mexico, showed again a remarkable parallelism of the mountain ridges, those in this latitude having a northwest trend nearly parallel to the Rocky mountains, as shown by Lewis and Clarke.

The maps of Lieutenants Abert and Peck, of Lieutenant Simpson, of Lieutenant Beckwith, Lieutenant Williamson, and Lieutenant Parke, have all shown a local parallelism to exist in different parts of the mountains. The systems of ridges have courses varying from a few degrees north of east to north 45° west.

The idea has lately begun to prevail that this local parallelism is the characteristic of the great mountain mass throughout its whole extent. Whether this idea has been true or not it has been attended with some practical advantages. Instead of one or two main summits for an overland road to pass, it shows us that we must expect many. On every route explored across the continent, at least four well-defined summits have been discovered, and on some of them many more. Some of these ridges enclose interior hydrographic basins. Others are traversed by rivers, but the passes thus made are generally impracticable, and, for the purposes of travel, might almost as well never have existed.

In many places, however, the mountain ridges have not this local parallelism, of which a few instances will be cited. The Uintah mountains, east of the Great Salt Lake, trend nearly east and west; the Wind River mountains about north 45° west; and the Humboldt range about north 20° east; these three ranges being comparatively near to each other.

Humboldt, in speaking of the Sierra Nevada, says, "it soon separates into three branches."

Lieutenant Abbot, in the Sixth Volume of the Pacific Railroad Reports, says: "Shasta Butte, although generally considered a peak of the western chain of the Sierra Nevada, is, in truth, the great centre from which radiate, beside several smaller ridges, the Cascade range, the Coast range, and the western chain of the Sierra Nevada."

There are many other portions of this mountain region from which the ridges seem to radiate. Such as Long's Peak, the junction of the Sierra Nevada, and Coast ranges in Southern California, &c., as is evident on an inspection of the map. The parallel system of ridges has been con-

sidered a matter of importance, as being in accordance with some supposed laws of mountain formation, but that of centres of upheaval are not less consistent with those laws. At any rate it does not appear that we are at liberty to assume a parallelism of ridges till examination has shown this to be the case.

As many of the lines of explorations in the mountains have been conducted along lines running east and west, leaving unexplored spaces between them, much ingenuity and skill has been bestowed in attempting to determine the continuations of ranges between the routes. Leaving out of view the fact that they may not be continuous, the effort has been made to determine the continuity by prolonging their directions. This assumes a degree of accuracy in the relative geographical position of the supposed parts which they may not have. There is generally too little known of the mineral constituents of each portion to settle the question on geological principles. The result of these arrangements have therefore been of little utility, while they have confused the nomenclature by extending local names beyond their proper limits. Of this confusion the Sierra Madre is a striking example, as will appear from the following quotations:

Humboldt, in his work on New Spain, says: "To the north of the 19th parallel of north latitude, near the celebrated mines of Zimapam and Doctor, the Cordillera takes the name of Sierra Madre; it runs to the northwest, towards the towns of San Miguel el Grande and Guanaxuata. To the north of this last city the Sierra Madre assumes an extraordinary width. It soon separates into three branches, of which the easternmost loses itself in Leon; the western branch extends northwesterly towards the Gila, through Sonora. The third branch of the Sierra Madre, which may be looked upon as the central chain of the Mexican Andes, occupies the whole of Zacatecas. It may be traced to the Sierra de los Mimbres; thence it crosses New Mexico, and joins the Crane mountains and Sierra Verd. It is the crest of this central branch of the Sierra Madre that divides the waters of the Pacific Ocean from those of the Gulf of Mexico. It is the continuation of this which Fidler and the intrepid Mackenzie examined from the 50th to the 55th parallel of north latitude."

Mr. Albert Gallatin writes, in a communication to Lieutenant Emory, (Ex. Doc. 41, 1st session 30th Congress:) "I use the word Sierra Madre in the sense attached to it by the Mexicans, viz: that ridge which separates the waters that fall into the Atlantic from those that empty into the Pacific, without reference to its elevation."

Lieutenant Simpson, in his report of his expedition to the Navajo country, says, in speaking of the Sierra de los Mimbres or Sierra Madre: "Our exploration shows that, instead of its exhibiting, in transverse section, the sharp angles of the primary mountains, or the flat table-shaped aspect of the mesa formation, it presents more strictly the outline of a formation" in which "the country intervening between the far distant escarpments" is "considerably convex."

Mr. Froebel, in his report published by the Smithsonian Institution in 1854: "I come now to speak of the *Sierra Madre.* This denomination has been the cause of many geographical misunderstandings and misconstructions. It has been understood as a real proper name, while it is but an appellative meaning the mother chain of mountains, *i. e.*, the principal chain of a country in general, just as the Mexicans call *Acequia Madre* the principal channel of a system of irrigation. Thus the name may occur in different localities without thereby authorizing geographers to conclude that all the mountain chains which have received that denomination belong to one and the same system. It may therefore really be, as some maps have it—I do not know from what source—that a certain chain *east* of Durango, belonging to the line of ridges

which passes over from Texas to Mexico, is known under the name of Sierra Madre. It is certain, and every one who has travelled across Mexico in that latitude knows it, that the Sierra Madre, in the sense generally adopted in that country, is *not east*, but is *west* of Durango, and is passed by the road from that city to Mazatlan. Of a mountain chain in New Mexico called Sierra Madre, and pretended to be situated on the western side of the Rio Grande, I have never heard. But if the name should occur there, too, as some maps likewise have it, I am almost sure that it has only been used by some Mexican theorist, who wanted to convey a general idea of the geography of the country according to his own fancy."

Mr. Froebel traces *his* Sierra Madre northwest, towards the Gila, and finally unites it with the Coast mountains of the Pacific; or, to use his own words: "Thus the extreme northwestern spur of the Sierra Madre constitutes what has been called by geologists the San Bernardino range, but has been known to the old Californians under the name of Sierra Madre, as I have already stated. If, therefore, the Sierra Madre has a northern equivalent, we have to look for it, not in the Rocky mountains, but in the Sierra Nevada system."

In Major Emory's Report on the Mexican Boundary Surveys, page 40, he says: "The idea conveyed by the name Sierra Madre is very generally adopted by the Mexicans, yet I doubt very much if any continuous range or chain of mountains can be found which separates the waters flowing into the Pacific from those flowing into the Atlantic. I am also quite well satisfied that the mountains known as Sierra Madre, in New Mexico, are not the same range as those known by that name in Chihuahua and Sonora, and that both are distinct from the range west and south of Monterey of the same name."

We see from these extracts that there are two principal meanings attached to the words Sierra Madre—one is a "*dividing line*" between the two great water-sheds of the continent, the other a *mountain range.* In this last sense it has been applied to so many different ranges that, to include them all, it must be considered a general name for the entire mountain system west of the Mississippi.

An exhibition of the efforts which have been made to extend and generalize the name Rocky mountains, &c., would be attended with similar results. I have therefore disregarded all these generalizations on the general map, by giving to the mountains only their local names.

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TOPOGRAPHICAL MAPS, PROFILES, AND SKETCHES,

TO ILLUSTRATE THE VARIOUS

REPORTS OF SURVEYS FOR RAILROAD ROUTES

FROM THE

MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

WASHINGTON, D. C
1859.

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THE LOWER CAÑON

THE FIRST TERRACES.

SNOWY MOUNTAINS IN THE DISTANCE.

GOSHOOT RANGE

WA-HO-I MOUNTAIN.

CAMP MAY 17th TO 18th

VALLEY OF THE HUMBOLDT RIVER AT LASSEN'S MEADOWS

B

HUMBOLDT PASS

VALLEY OF THE MUD LAKES

C. SCHUMANN FROM F. W. EGLOFFSTEIN.

SELMAR SIEBERT'S ENGRAVING & PRINTING ESTABLISHMENT, WASHINGTON, D.C.

MADELIN PASS.

JUNE 19TH AT 2 P.M. VIEW TAKEN FROM MOUNT OBSERVATION

SHOWING 70 MILES OF THE PROJECTED LINE OF RAILROAD.

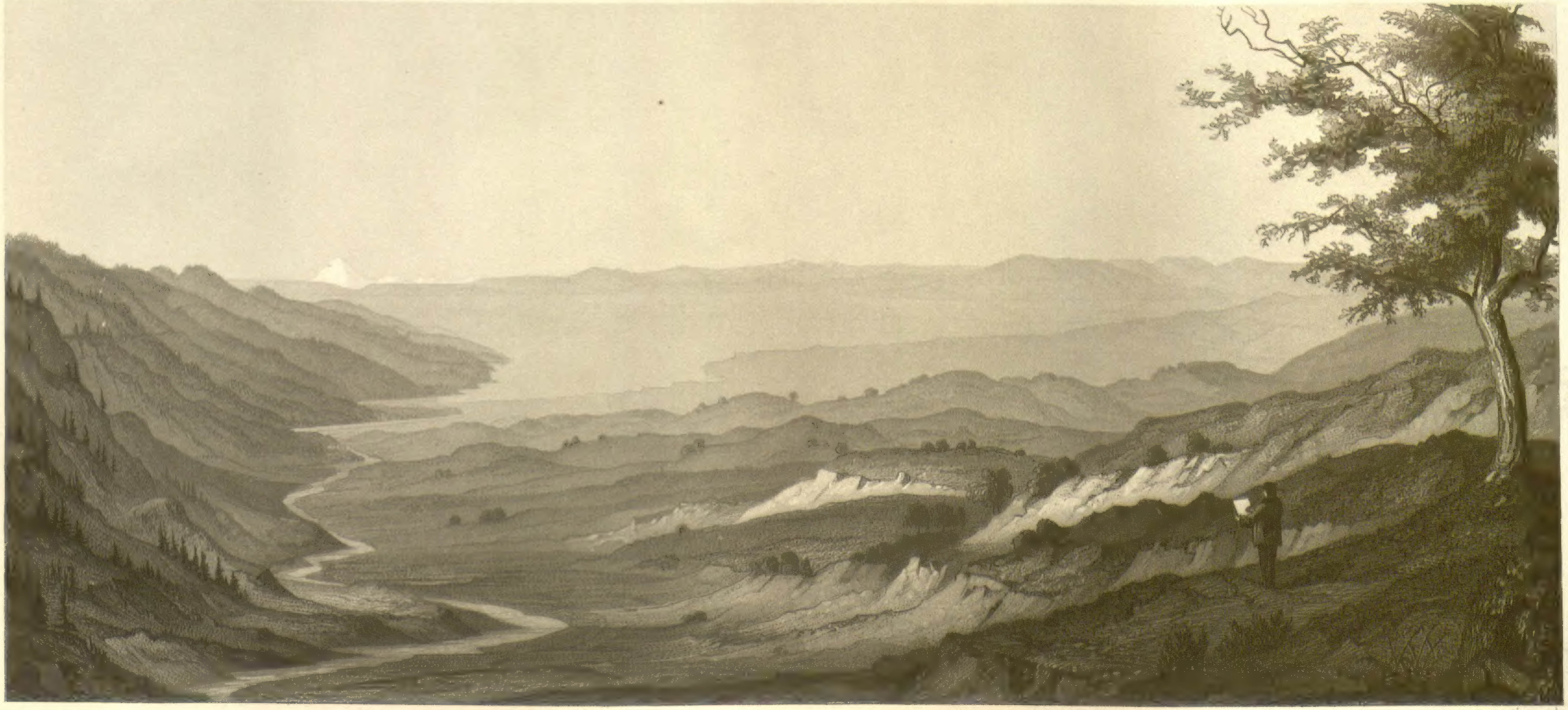
1854.

LOOKING EAST FROM

D

SEE MAP.

S. 67° W. M°. CAMP JUNE 22D TO 23D. CAMP JUNE 23D TO 24TH. SECOND DIVIDE IN MADELIN PASS. MOUNT SHASTA 100 MILES DISTANT. MADELIN PLAINS. SNOWY SIERRA NEVADA AT THE SOURCES OF THE UPPER SACRAMENTO OR PITT RIVER. ROLLING HILLS OF THE SIERRA NEVADA. FIRST OR MAIN DIVIDE IN MADELIN PASS. CAMP JUNE 18TH TO 19TH. GREAT BOILING SPRING POINT. CAMP JUNE 17TH TO 18TH. CAMP JUNE 16TH TO 17TH. MUD LAKE PEAK. SOUTHERN MUD LAKE. CAMP JUNE 19TH TO 20TH. VALLEY OF THE UPPER SMOKY CREEK. CAMP JUNE 20TH 21ST AND 22D. ENTRANCE TO THE PASS. SNOWY SIERRA NEVADA WEST OF PYRAMID LAKE. S. 12° E. M°.



C. SCHUMANN FROM F.W. EGLOFFSTEIN. SELMAR SIEBERT'S ENGRAVING & PRINTING ESTABLISHMENT WASHINGTON D.C.

WEST END OF MADELIN PASS.

JUNE 26TH AT 8 A.M. FROM A PEAK OVERLOOKING MADELIN CREEK.

S.67°W.M? MT. SHASTA. SACRAMENTO RIVER DESCENDING THROUGH ROUND VALLEY IN THE DISTANCE. N.8°W.M?

C. SCHUMANN FROM F. W. EGLOFFSTEIN.

SELMAR SIEBERT'S ENGRAVING & PRINTING ESTABLISHMENT, WASHINGTON D. C.

NORTHERN SLOPES OF THE SIERRA NEVADA.

JUNE 30th AT 9 A.M. VIEW TOWARDS THE WEST
1854.

PEAKS OF THE SIERRA NEVADA
NORTHERN SIERRA NEVADA
DISTANT PASSAGES OF THE UPPER SACRAMENTO RIVER SOUTH OF Mt SHASTA DIVIDING THE SIERRA NEVADA ON THE SOUTH
FROM THE CASCADE MOUNTAINS ON THE NORTH
CAMP JUNE 28 TO 29
CASCADE MOUNTAINS
FIRST CAÑON OF THE UPPER SACRAMENTO RIVER

S 55° W Mt
FOOT OF FIRST CAÑON
SECOND CAÑON OF THE UPPER SACRAMENTO
SOUTH END OF CASCADE Mts
PLAINS OF THE UPPER SACRAMENTO
COAST RANGE 100 MILES DISTANT
MOUNT SHASTA 50 MILES DISTANT
FALL RIVER PLAINS
LOW GAPS AT THE HEADWATERS OF FALL RIVER
N 47° W Mt

TAKEN FROM
E
SEE MAP

C. SCHUMANN from F.W.EGLOFFSTEIN.　　SELMAR SIEBERT'S ENGRAVING & PRINTING ESTABLISHMENT. WASHINGTON D.C.

PORTION OF THE MAIN MOUNTAIN PASSAGE.

OF THE UPPER SACRAMENTO OR PITT RIVER.

JULY 20TH AT 1 P.M. 25 MILES SOUTH OF MT. SHASTA.